MODERN Machine Shop

APRIL, 1951

OK series 3600
the BLACK ANGUS of face mills with

More Beef in the Body

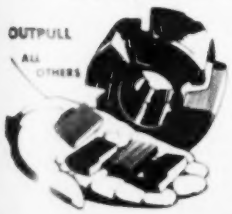


For the heaviest cuts that the biggest milling machines can pull.

OK Face Mills, size for size, have more weight, more substance, more beef in the body. And blades are huskier with a greater proportion of carbide available for cutting. It is a proven fact these cutters remove more metal in a given period than other cutters which are complicated and weakened by recesses for screws, pins, gibs or locking devices.

OK cutters consist of just two components—the body and the blades. Blades are simple wedge-shaped* blocks, serrated on one face with matching serrations in the body. They are solidly seated by a driving fit, easily extracted with a drift, and stay put under the fastest speeds and heaviest feeds. The simple strength and ruggedness permit the placement of more blades in the fine pitch series and heavier blades in the coarse pitch series.

You need the OK competitive advantages. Take your toughest job and let OK engineers have a go at it.



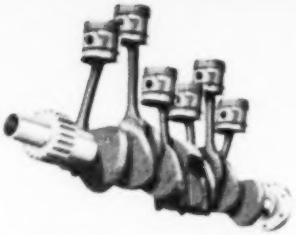
*The wedge is the world's simplest and strongest basic mechanical device

OK

modern milling cutters
for modern milling machines

THE O.K. TOOL COMPANY, WILTON, NEW HAMPSHIRE
Division Williams and Hussey Machine Company, Inc.

PISTON PRODUCTION



UP 21%

New Heald Bore-Matic bores and grooves automotive pistons *three at a time*



When it comes to high speed precision production, the automotive industry has consistently set the pace. Perhaps that's because so many automotive manufacturers bring their precision finishing problems to Heald.

The installation shown below is a typical example. This new Model 322 Bore-Matic boosted piston production 21% over previous methods. The pistons are bored and grooved three at a time in a single, high-speed, automatic cycle. All the operator has to do is load the parts, throw the starting lever, and remove the finished pistons. Even the loading and unloading have been speeded up by a three-station, hydraulic clamping and locating fixture.

Remember — when it comes to precision finishing, it pays to come to Heald.



HEALD

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VOLUME 23 NUMBER 11
APRIL, 1951

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MODERN Machine Shop

Contents

Features in This Issue 93

Continental Plant Is Well Equipped 94
By D. C. Herricks

Straightening Methods and Equipment, Part II 108
By John E. Hyler

Sequential Sampling Simplifies Receiving Inspection 132
By Gilbert C. Close

Progressive Dies and Their Machines 156
By C. W. Hinman

Conference Advocates "Stitch in Time" Maintenance Programs .. 170
By H. H. Slawson

Isotopes at Work 196
By Frank Charity

Highlights of Papers Presented at ASTE Know-How Session .. 214

Shaping of Metals Forum 240

Modern Equipment at Work

—Rotary Straightener Reduces Lost Production Time 248

—Earth-Moving Equipment Parts Hot-Forged on 5,000-Ton Hydraulic Press 250

—Liquid Blasting Cuts Die Polishing 10 Per Cent 252

—Gaging Unit Classifies Precison Parts in Increments of 0.0001 Inch 256

—Arc Welding Reduces Machining in Redesign of Foundry Equipment 258

—Giant Nuts and Screws Produced for Steel Rolling Mills .. 264

Ideas from Readers

—Vibratory Tray Arrangement for Feeding Heat-Treating Furnaces 268
By Herbert Chase

—Support for Cutting Circles with a Torch 269
By John E. Hyler

—Adjustable Groove Cutter Features Quick Adjustment 272
By H. G. Frommer

—Removing Kinks from Bent Tubing 276
By Irwin Mansfield

—Slot in Cutoff Tool Eliminates Chatter 278
By Frank M. Butrick, Jr.

News of the Industry 280

New Shop Equipment 332

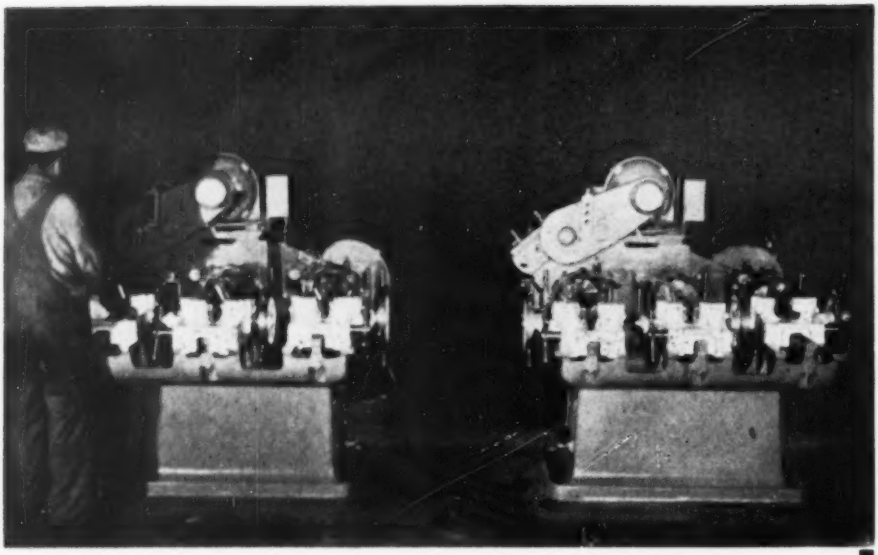
Services Directory 398

"Where to Get It" 400

Cartoon 408

Over the Editor's Desk 410

Index to Advertisements 412



Railroad Cuts Standby Maintenance Costs

• Large savings in capital invested in heavy machinery and hourly labor costs have been effected in the maintenance shops of the Chicago, Burlington, and Quincy Railroad. In the past, four machines, each with an operator, were used exclusively for threading 1¼" steam engine bolts.

Recently two Landis 1½" Triple Head Threading Machines were installed in these shops. These Landis Machines now do the work previously done by the four other machines of another type. Two men now operate these machines where four men were previously required. Such savings are one reason for the widespread use of Landis Threading Equipment in railroad shops throughout the country.

LANDIS Machine COMPANY
WAYNESBORO, PENNA.

THREAD

For further information and specifications, write for Bulletin B-55.

CUTTING, GRINDING, & TAPPING EQUIPMENT

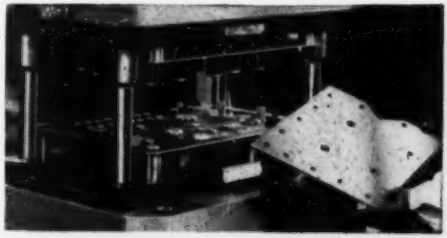
New • Fast • Proven

LOW COST methods for PERFORATING and NOTCHING SHEET METALS

Both methods feature: LOW DIE COSTS

All units and parts are interchangeable and used repeatedly in different arrangements. **INCREASE PRESS PRODUCTION** – Down time is minutes as compared to hours for changeover. For precision work in all types and sizes of presses. **START PRODUCTION *at once.*** Pierce up to ¼" thick mild steel. Saving money in the best known plants.

Whistler *MAGNETIC* Dies at work in large inclinable press. Magnetized units hold the retainers. No bolting required. A fast, economical method in making up a punch and die set for short or long runs. All parts re-usable.



Whistler *ADJUSTABLE* Dies on ⅛" steel perforating and notching job, using Tee slotted die set. With Whistler Punch and Die units production starts within hours instead of weeks. Last minute job changes made quickly.



Here are the complete details with prices and application illustrations. Send for these catalogs. No obligation.



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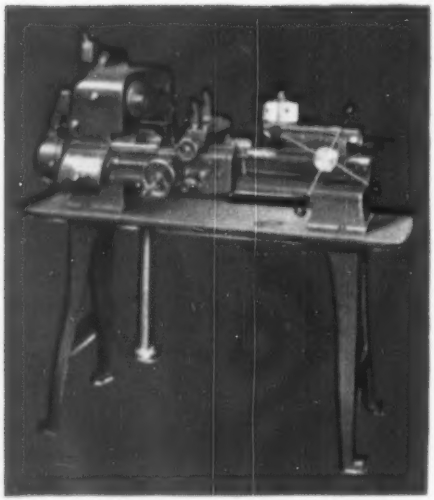
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FOR PROVED PRODUCTION PERFORMANCE

Production results over the years have demonstrated the efficiency, durability and economy of Logan Lathes. These results are the reasons why industry is using more Logan Lathes today than ever before.



Logan No. 940-2—11" Quick Change Gear Turret Lathe with 1" Collet Capacity, and 1⅛" Spindle Hole. One of 37 Models of Logan 10" and 11" Swing Lathes

THESE LOGAN CHARACTERISTICS WILL HELP YOUR PRODUCTION

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With 1" collet capacity, 11" swing, 1⅛" spindle hole and center distances of 24" and 36", Logan Lathes have the size to handle substantial work.

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Less than .0005" spindle runout 12" from the bearing . . . two V-ways and two flat ways precision ground to within .0005" variation . . . these are typical Logan Lathe construction tolerances.

VERSATILITY . . .
The Logan Lathe gives you spindle speeds of 45 to 1500 rpm with no bearing adjustment. A complete line of accessories further equips these versatile tools for every type of lathe operation.

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With its ball bearing mounted spindle, its self-lubricating bronze bearings at vital wear points, and its rugged overall construction, the Logan Lathe retains its accuracy and dependability under constant use.

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By reducing power costs; by saving vital floor space; by quick, easy set-ups; by lasting accuracy and low maintenance; Logan Lathes put many metal turning operations on an economical and profitable basis. The saving to be realized on your original investment in Logan Lathes is a further economy well worth considering.

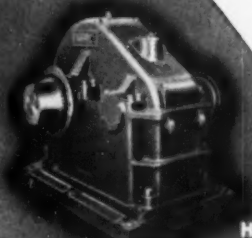
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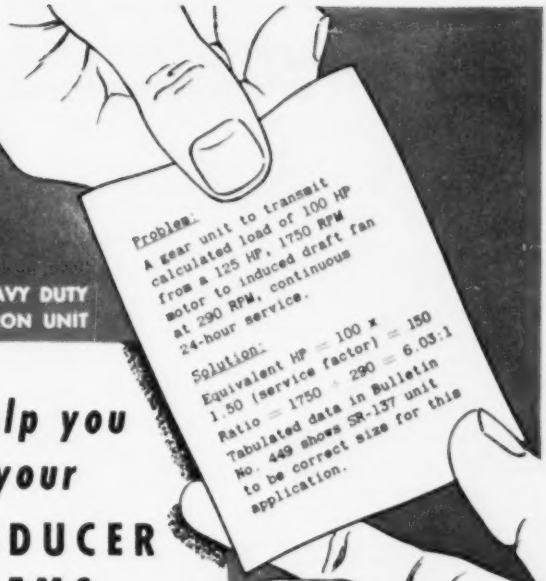
FOR FULL INFORMATION, VISIT YOUR LOGAN DEALER, OR WRITE

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HEAVY DUTY
SINGLE REDUCTION UNIT



Let us help you solve your

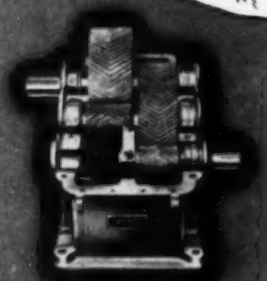
SPEED REDUCER PROBLEMS

Farrel speed reducers incorporate the experience gained in the solving of innumerable problems requiring considerable pioneering in gear engineering. The result is a wide range of types that are standard in principal features, but adaptable in critical detail.

All units have precision gears; shafts and bearings factored to safeguard against interruption of vital processes; heavy-section cases with joints sealed to keep out dust and dirt. But, that is not all. The design of these units permits an engineering freedom in proportioning gears, shafts, bearings and even some housing dimensions to meet specific requirements. This flexibility has resulted in the solution of innumerable application problems.

Send for a copy of Bulletin 449.

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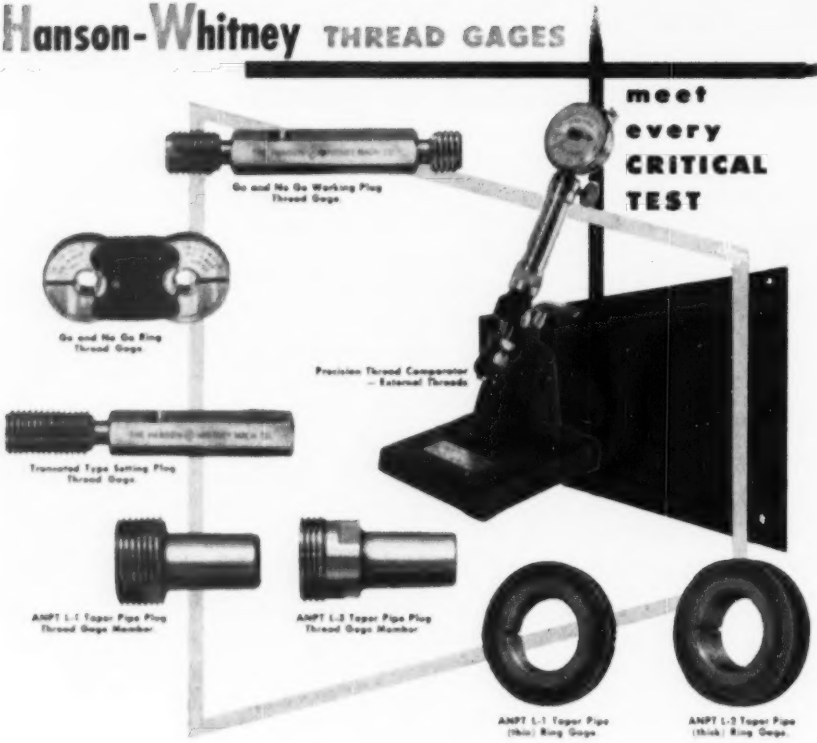


DOUBLE REDUCTION UNIT

FB-454

Hanson-Whitney THREAD GAGES

meet every CRITICAL TEST



The defense program, now spiraling, is going to wear out thousands of gages — especially those of sub-standard quality.

To insure continual close tolerance production, and longer gage life, specify Hanson-Whitney Gages—manufactured of the best materials to exacting Federal Government Standards, subjected before shipment to a battery of rigid Hanson-Whitney tests.

The H-W gage group illustrated provides you with a complete inspection gaging set-up for practically any thread regardless of form, pitch, or major diameter.

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Even **unskilled** operators can speed cutting time with a

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To meet today's demand for more accurate and faster production, put the new Walker-Turner 16" Band Saw to work in your shop. Any operator, even unskilled labor, can quickly learn to handle these machines. Built to simplify cutting operations, like all Walker-Turner power tools they're *fast, accurate, safe,* and *easy to handle.*

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Find out more about this practical way to increase output while reducing production costs. Ask your Walker-Turner distributor today about the new 16" Band Saw. Or write direct for the complete catalog of this and other Walker-Turner Power Tools for metalworking operations.

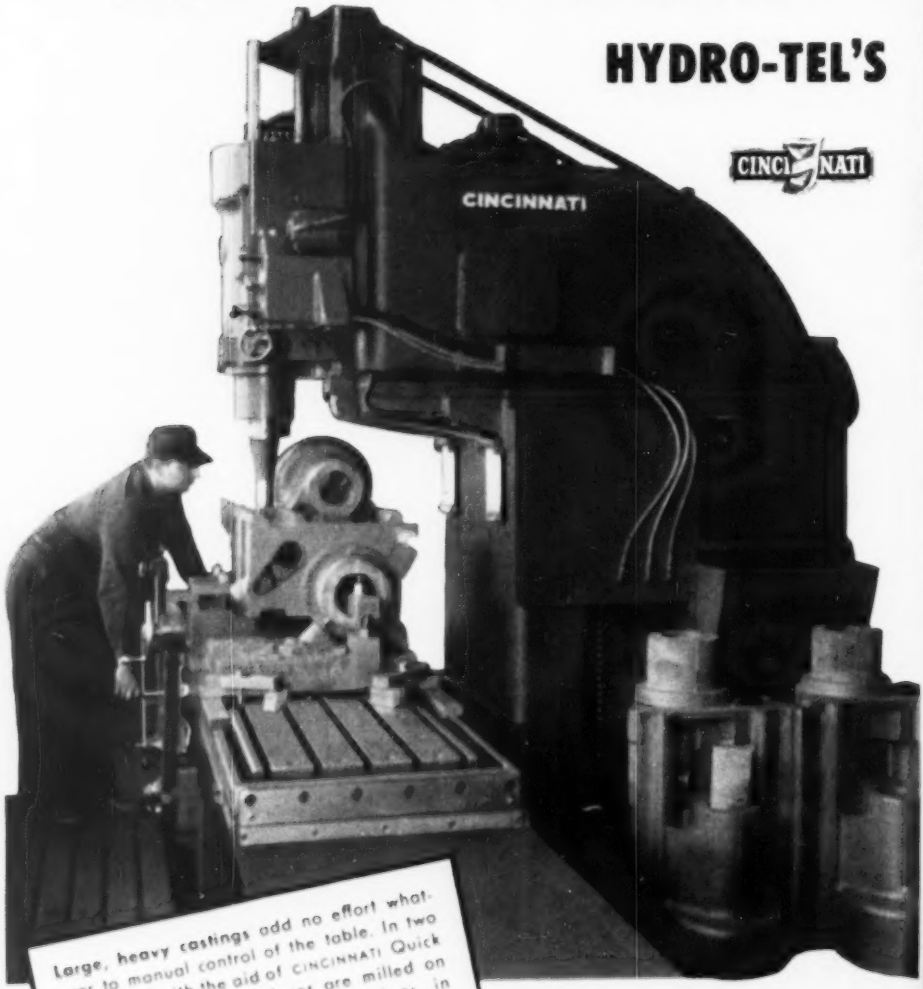
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Aid to Production

HYDRO-TEL'S



Large, heavy castings add no effort whatever to manual control of the table. In two setups and with the aid of CINCINNATI Quick Change Collets, 18 surfaces are milled on two sides of vertical head castings in about 450 minutes total time. This 28" Vertical Hydro-Tel has a raised rear base to accommodate 44" vertical capacity.

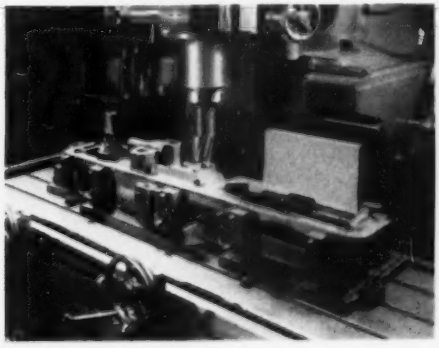
CINCIN

of large parts...

FLEXIBILITY AND EASE OF OPERATION

If you had enough helpers, you could quickly push a piano around your living room with one finger. That's just about the advantage gained through manual controls of easy-to-operate Hydro-Tel Milling Machines. **And it's a very worthwhile consideration for your replacement program.** ¶ Hydro-Tel's flexibility and ease of operation aid production of small lots in this manner: the flick of a lever whips the table to position, and a second lever operates the cross slide just as quickly. Each lever controls rapid traverse and feed rates in both directions; they can be operated in unison or independently. No time need be lost in positioning the work and cutter. If the job requires manual traverse of table and cross slide, it can be accomplished with practically no effort, for hydraulic power does the work while the operator rotates a handwheel. Other factors being equal, easy operation and flexibility definitely increase production. Operators like the Hydro-Tel, too, so give your operators and production a break by replacing your outdated milling machines with CINCINNATI Hydro-Tels.

THE CINCINNATI MILLING MACHINE CO.
CINCINNATI 9, OHIO



Hydro-Tel milling saves 254 minutes per casting. A multitude of milling operations on the hydraulic unit casting in the illustration formerly required a total of 572 minutes. When the job was assigned to a CINCINNATI 28" Vertical Hydro-Tel, tooled up for small lots, total milling time dropped to 318 minutes, due primarily to Hydro-Tel's exceptional flexibility and ease of operation.

For complete specifications on CINCINNATI 28" Vertical Hydro-Tel Milling Machines, write for catalog No. M-1284-3.

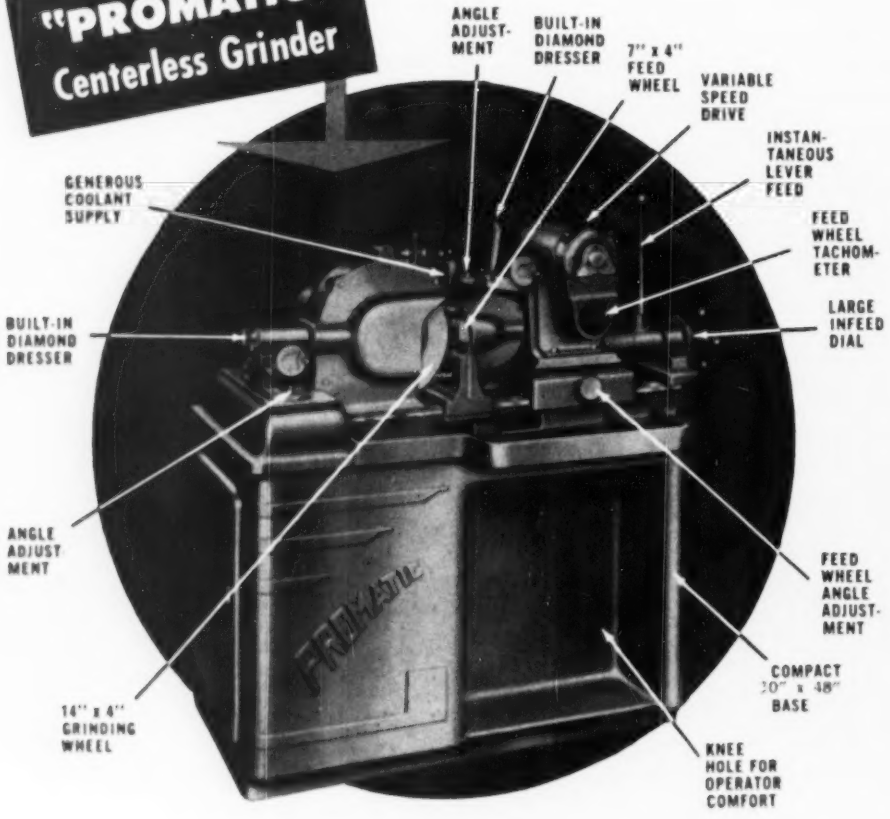
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MILLING MACHINES • CUTTER SHARPENING MACHINES
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OPTICAL PROJECTION PROFILE GRINDERS • CUTTING FLUID

High *in precision!*
SMALL *in size!*
LOW *in cost!*

"PROMATIC" Centerless Grinder

HERE'S THE CENTERLESS GRINDER you've been waiting for . . . All the features you need for speed, accuracy and finish—in a machine size that handles a majority of common work sizes—and a price considerably lower than you would expect!



Before you buy ANY *centerless grinder get full information on* PROMATIC-*Built for precision at a fraction of usual cost.*

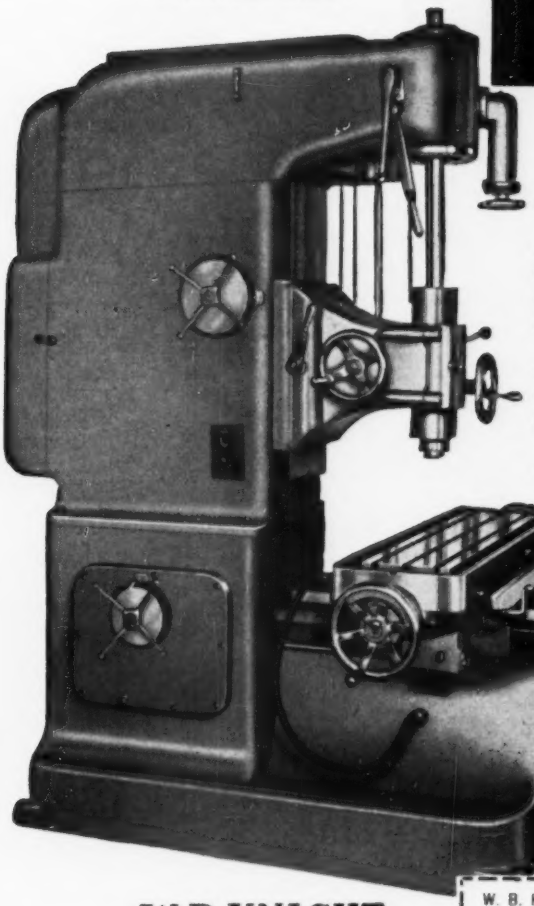
DIVERSIFIED METAL PRODUCTS CO., 5123 Alcoa Ave., Los Angeles 58, Calif.

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✓ ELIMINATES WORK TRANSFERS!

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VERTICAL MILLING & PRECISION BORING MACHINE



. . . DOES THE WORK OF 2 MACHINES!

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- Fast, versatile, easy operation
- Exceptional cross table travel
- Extra long spindle travel
- Complete range of spindle and table speeds and feeds
- Ruggedly built for accuracy
- Ample power for tough jobs
- Convenient quick-action controls
- Full vision work areas

Mail Coupon **NOW!**

16 Spindle speeds, 40 to 2000 r.p.m.—9 Spindle feeds, .0005" to .010"—100" rapid traverse per minute in both directions—16 Table feeds, 5/16" to 20" per minute.

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MACHINERY COMPANY

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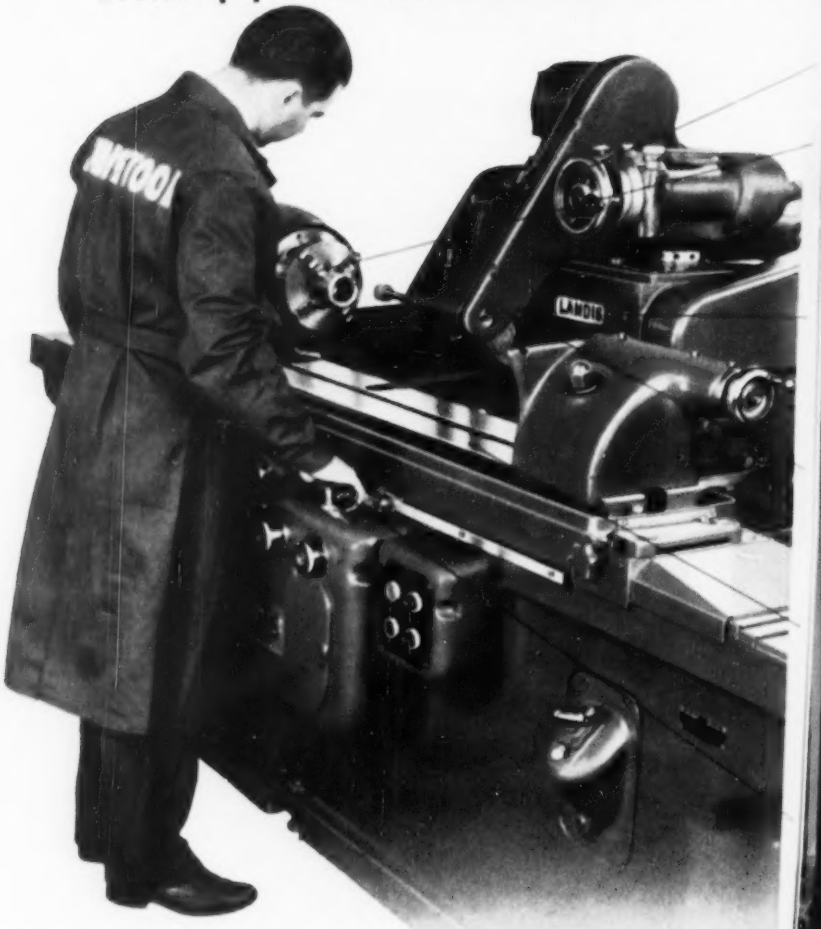
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6 design features of LANDIS TOOL

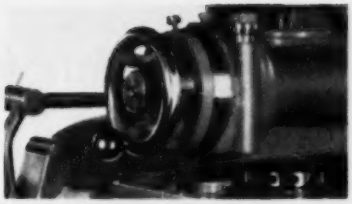
. . . that pay off in BETTER PERFORMANCE



LANDIS TOOL
Precision Grinders

Just off the press—a new 28-page catalog describing in detail the ***LANDIS TOOL*** *12" Type CH Universal Grinder. Write for your copy today.*

Hydraulic Universal Grinders



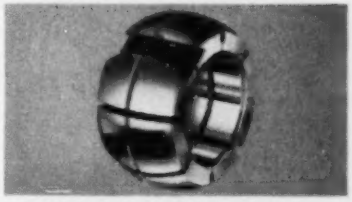
EYE-LEVEL WHEEL FEED

Easy to read—easy to see. Operator feeds the wheel and watches grinding action without turning his head. Less fatigue.



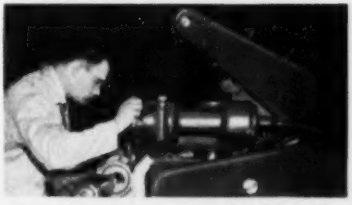
VARIABLE SPEED HEADSTOCK

Now you can hit the right work speed on every job for maximum production and quality. Choice of infinite number of speeds within range of machine. Only two revolving parts; the motor spindle and headstock face plate make a simple, compact mechanism.



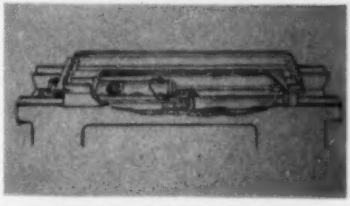
MICROSPHERE WHEEL SPINDLE BEARINGS

Close clearance between spindle and bearing obtained with adjustable Microsphere bearings. Wheel spindle enlarged in diameter between bearings to minimize deflection while grinding. Results in accurate work and quick spark out.



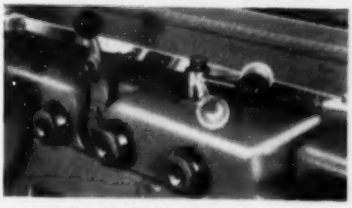
SWINGING INTERNAL FIXTURE

With a quick, simple change you can change from external cylindrical grinding to internal grinding. Rigid bracket with belt guarded and in tension at all times.



HYDRAULIC OPERATION

LANDIS TOOL hydraulic operation of table traverse and wheel feed gives the smooth power and "velvet touch" that produces fine finishes. Adjustable traverse rate, tarry at reversal and wheel feed, permits quick setup.



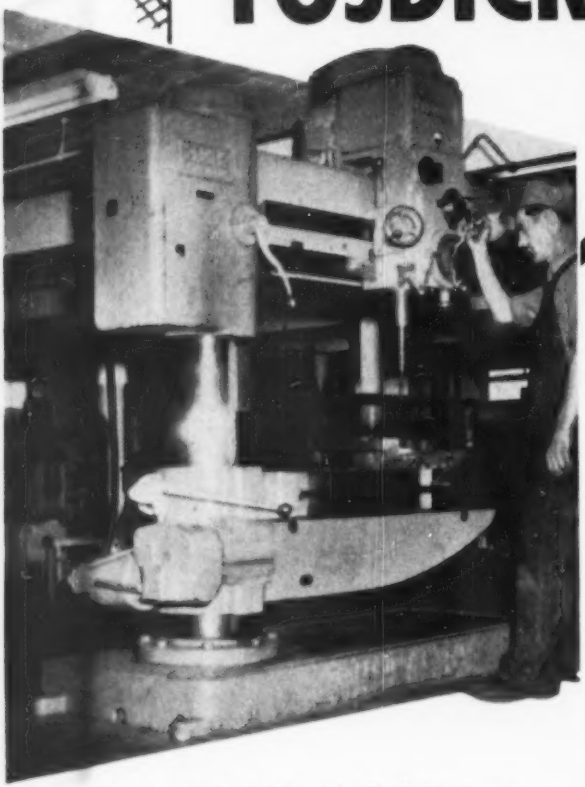
RAPID HYDRAULIC WHEEL POSITIONING

Wheel positioning by simple lever movement gives big savings where setups are frequent . . . cuts wheel positioning time 50% or more . . . reduces operator fatigue. (Extra equipment)

LANDIS TOOL COMPANY / WAYNESBORO, PENNA.

Fits right into your Production Scheme

FOSDICK Sensitive RADIAL



This shows a Fosdick Sensitive Radial in operation at the Borden Mills Plant, Kingsport, Tenn. You'll find them saving time and costs in plants all over the country from Maine to California, and from Canada to Texas.

•

Our new bulletin gives all the details of construction and fully describes its modern features. Write for the Fosdick Sensitive Radial Bulletin S.R. M.M.S.

Because of its high utility factor this machine fills the gap between the large Radial and the Sensitive and Upright Drills. It fits right into the production scheme of both large and small shops.

It has the sturdy construction and flexibility of Radial design plus the high speed characteristics of the Sensitive Drill.

The heavy base construction — the one-piece column—and the adjustable swinging table assure unusual rigidity for sensitive drilling operations. The arm is at a fixed height within easy reach of operator on all jobs. Both table and arm swing in an arc of 360°.

The nine speeds and four feeds are controlled by means of direct reading levers on the head. Thus all operating feeds and speeds are easily attained from the operator's normal working position.

This comparatively new machine is finding its way into hundreds of plants where there are small pieces requiring a number of holes to be drilled. Perhaps it will fit into your production scheme at a cost that is surprisingly low.

FOSDICK MACHINE TOOL CO.
CINCINNATI 23, OHIO

Jarvis

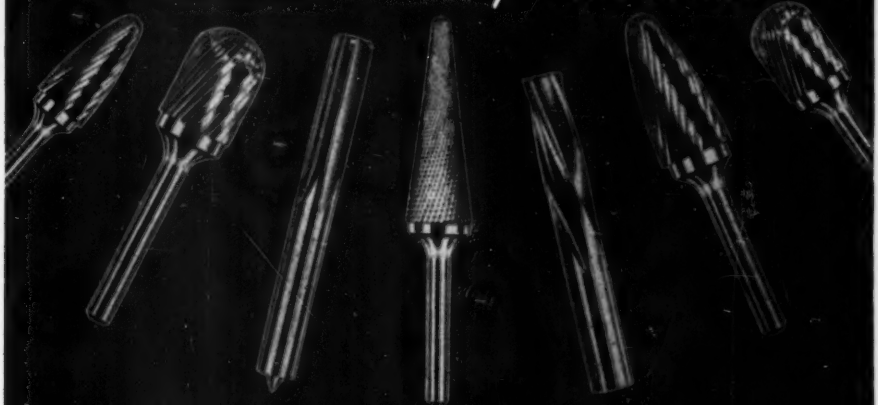
SOLID TUNGSTEN CARBIDE TOOLS

PRECISION MACHINE GROUND

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REAMERS

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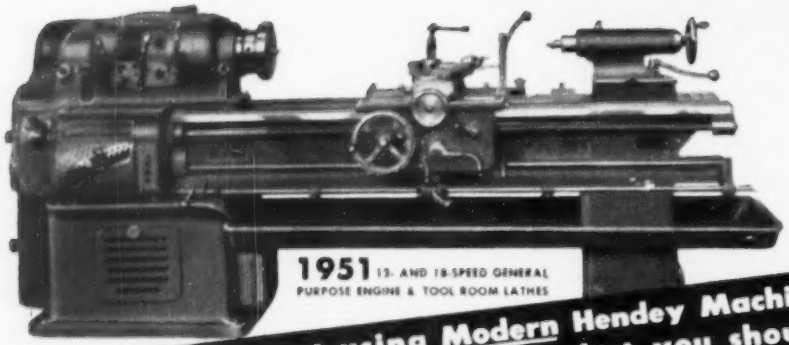
BORING BITS
END MILLS



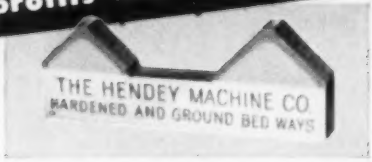
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THE CHARLES L. *Jarvis* COMPANY
MIDDLETOWN IN CONNECTICUT

TECNI-TAPS • TORQOMATICS • MULTI-TAPPERS • FLEXIBLE SHAFT MACHINES

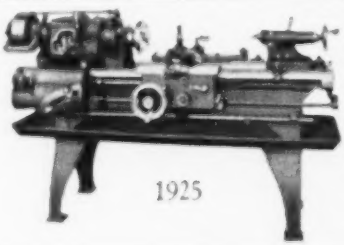


.... If you are not using Modern Hendey Machines you are not earning the profits that you should!



Hendey Engine and Tool Room Lathes have been, and always will be, tops for accuracy. But, are you aware of the many other modern features of the new Hendey line? Like all Hendey Lathes, the 12- and 18-speed now have induction hardened and precision ground bed ways for both carriage and tailstock. Every important unit has fully automatic lubrication. The rear end of the spindle is graduated for indexing when cutting multiple threads, and there are 36 thread and feed changes. The precision, all-geared headstock is powered from a built-in motor in the cabinet leg. Spindle speed ranges from 19-1000 R.P.M. A choice of cam lock or long taper key drive spindle noses. Modern Hendey Tool Room Lathes are available with swings of 9", 12", 14", 16", 18", 20" and 24". Write today for full details and complete specifications.

This 8-speed Hendey Engine Lathe has long been obsoleted by the all-new Hendey 12- and 18-speed lathes. The 8-speed bed is not hardened and precision ground. Maximum spindle speed is only 426 R.P.M. Although a masterpiece of design and construction in its day, the 8-speed has been replaced by progressive manufacturers, because the 12- and 18-speed offer every modern improvement necessary to earn maximum profits.



Continuous, advanced engineering by Hendey is worth watching — and must be watched if you are to earn full profits from your lathes and shapers. For complete particulars and prices, contact your nearest Hendey office.

MODERN Hendey

THE HENDEY MACHINE COMPANY
Main Office & Plant: Torrington, Conn.
Branch Offices: New York, Chicago, Boston, Detroit, Rochester, Los Angeles, San Francisco
Representatives: Philadelphia, Cleveland, Pittsburgh

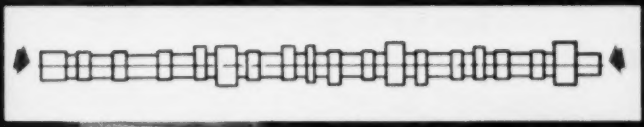
GARDNER

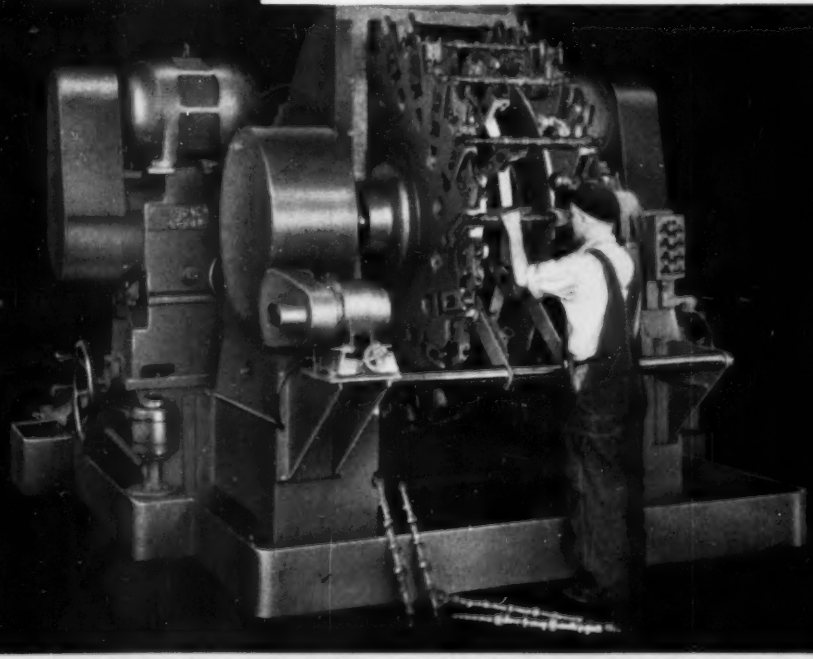
precision disc Grinders

Snag Grinding 1,000 Shafts Per Hour Lowers Unit Costs

TWO ends of camshaft ground in ONE operation

$\frac{3}{8}$" max. stock removed from each end of high test cast iron shaft. Rotating work carrying fixture with gravity unloading. Gardner 84B-40" Double Disc Grinder.





104MS



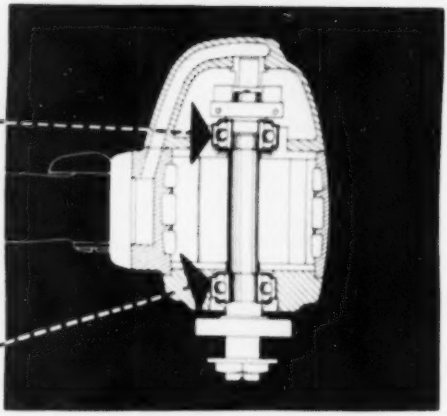
Request bulletin No. 12-7.

GARDNER MACHINE COMPANY

428 East Gardner Street • Beloit, Wisconsin, U.S.A.

Now!

for Buckeye Heavy-Duty GRINDERS, SANDERS, BUFFERS



completely sealed pre-lubricated bearings



Vertical grinder, one of many Buckeye tools equipped with pre-lubricated bearings.

lifetime lubrication

longer tool service life

eliminate lubrication costs

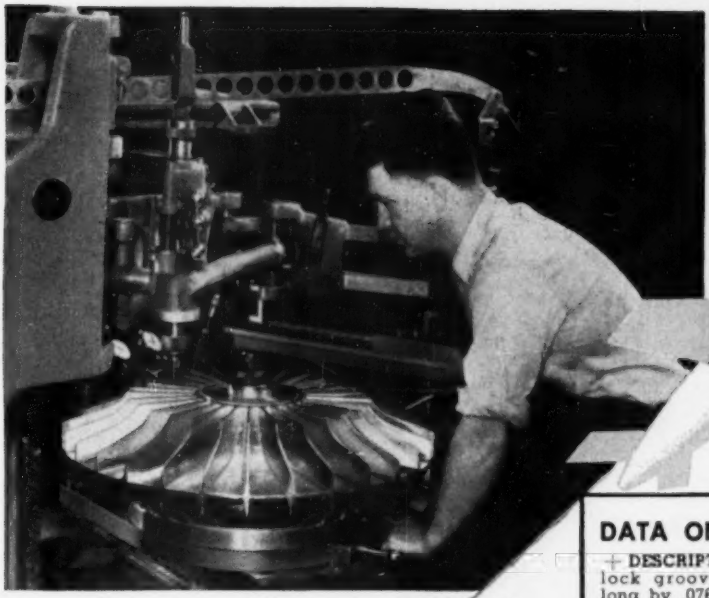
NOW —when every tool is needed for full-time service, Buckeye introduces portable air tools equipped with completely sealed, pre-lubricated bearings.

NOW —with bearings that never require lubrication, tools stay in service longer . . . there's less down-time due to lubrication faults . . . tool maintenance time is reduced —and you'll save every penny formerly spent on bearing lubrication.

NOW —this newest Buckeye engineering development is just one more reason why, in portable air tools, the best buy is Buckeye.

Buckeye Tools
CORPORATION
DIVISION 17 • DAYTON 1, OHIO

PORTABLE AIR AND ELECTRIC TOOLS FOR INDUSTRY



One application of the pantograph machine among hundreds throughout industry.

Production Zooms 500%
on Aircraft Engine Parts

With Gorton pantographs and die and mold duplicators, you increase production, lower costs and do more accurate profiling, routing, die sinking, mold cutting, counterboring, chamfering, grooving, graduating or engraving. These machines are indispensable on many jobs involving either commercial products or materiel for the armed forces.

You can machine ferrous, non-ferrous or plastic materials . . . in *work shape* that's flat, uniformly curved, cylindrical, spherical or irregular . . . in *work size* varying from dime-size parts to areas as large as 10 by 20 feet.

Repetitive accuracy, a dozen or a thousand pieces, is yours with *enlarged* masters that give you advantages of the reduction ratio — an *exclusive* pantograph characteristic. You can depend on fast cutting and high surface finish from high-speed steel or carbide cutters and burrs in a wide range of spindle speeds up to 45,000 R.P.M.

DATA ON THIS JOB

+ **DESCRIPTION:** Mill 58 key lock grooves 2.360"-2.460" long by .076"-.080" wide by .028"-.030" deep in edges of compressor impeller blades. Material is heat treated aluminum alloy forging; hardness — 120 Brinnell. Size, 28.800" dia., by 7⅝" thick.

+ **HOLDING FIXTURE:** Special; arranged for manual indexing and incorporating opposed dial indicators for positioning each blade.

+ **MASTER:** 3-dimensional, semi-automatic; pneumatically operated; enlarged 5 times.

+ **CUTTER:** 2-flute ball nose solid carbide, running at 10,500 R.P.M. Feed, 5.9" per minute with coolant. Depth of cut, .030"; width, .080".

+ **MACHINE:** Standard Gorton 3-L 3-dimensional pantograph with special tooling.

Results: **Floor-to-floor time, after set-up, is 58 minutes. Previous method took 5 hours.**

Mail coupon or write for copy of the Gorton General Catalog — no obligation.



Please send at once complete information about the Gorton line contained in Bulletin 1655-1704.

Firm .....

Name .....

Title .....

Address .....

City, State .....


It's
MORSE
MORSE
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the Shear Cut

of the MORSE "Hi-Helix" Design . . . that Really Cuts Your End-Milling Costs!

CHIPS CAN'T CLOG THE FLUTES of Morse End Mills made to this exclusive design. For the shear-cutting action clears the chips in a smooth, even flow. Cutting is far faster . . . tool-life far longer. And to get even longer tool-life, specify Morse Electrolized End Mills.

Morse Hi-Helix End Mills are precision-made . . . with 2 flutes for hogging . . . 4 or more for finishing. *See your Morse-Franchised Distributor.* He's the only one who can give you Morse-Quality for *every* type of end-milling job. He has the experience . . . and a complete Morse stock . . . to serve you promptly and well at all times.

Morse Twist Drill & Machine Co., New Bedford, Mass., *(Div. of Van Norman Co.)*
Warehouses in New York, Chicago, Detroit, San Francisco

MORSE
Cutting Tools

This is another of the
"HUNDREDS OF JOBS"
which can be done only on a
MARVEL **Band Saw!**



MARVEL BAND SAW saved these two 4400 lb. castings

Two sand cores washed out when these giant 4400 pound steel connecting rods were cast, resulting in solid eye ends without gaps. Then came the $64 question—how to machine out the $1\frac{1}{2}$" slots in the longitudinal center of the eyes which were 22" high and had a wall thickness of $6\frac{1}{2}$".

The Ernest J. Nelson Iron Works of San Francisco, did this "impossible" job easily, quickly and economically, without special tooling, on a standard Model No. 8M/2 MARVEL Band Saw. Two cuts were made in each rod in two hours per cut with tool cost of $3.06 per rod. The tool was a MARVEL B9-10 Band Saw Blade.

Every tool room, machine shop and maintenance department needs a MARVEL Series 8 Universal Band Saw—not only for innumerable everyday jobs but for the occasional "trick" operations, where its utmost versatility will save many headaches and dollars.

WRITE FOR CATALOG

These exclusive MARVEL features made this job easy:

1. Large, T-slotted work table.
2. Blade feeds into work vertically; work always stationary.
3. Power-pressure feed.
4. Automatic blade tension.
5. Built-in coolant system.
6. Large capacity.

Metal Cutting
MARVEL SAWS
Better Machines—Better Blades

see our CATALOG in SWEET'S FILE

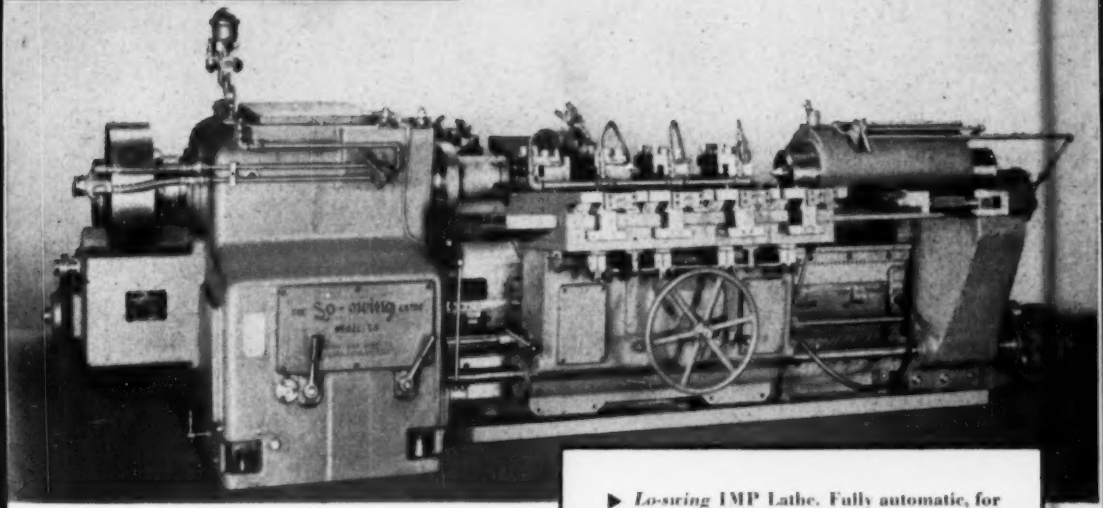
ARMSTRONG - BLUM MFG. CO.
5700 Bloomingdale Ave., Chicago 39, Illinois

PROVED ON ORDNANCE WORK



Lo-swing IMP, *proved on 40 mm shells and small Ordnance Parts.*

Model LS Lo-swing proved on 105 mm Gun Barrels, and 220 and 240 mm Shells.

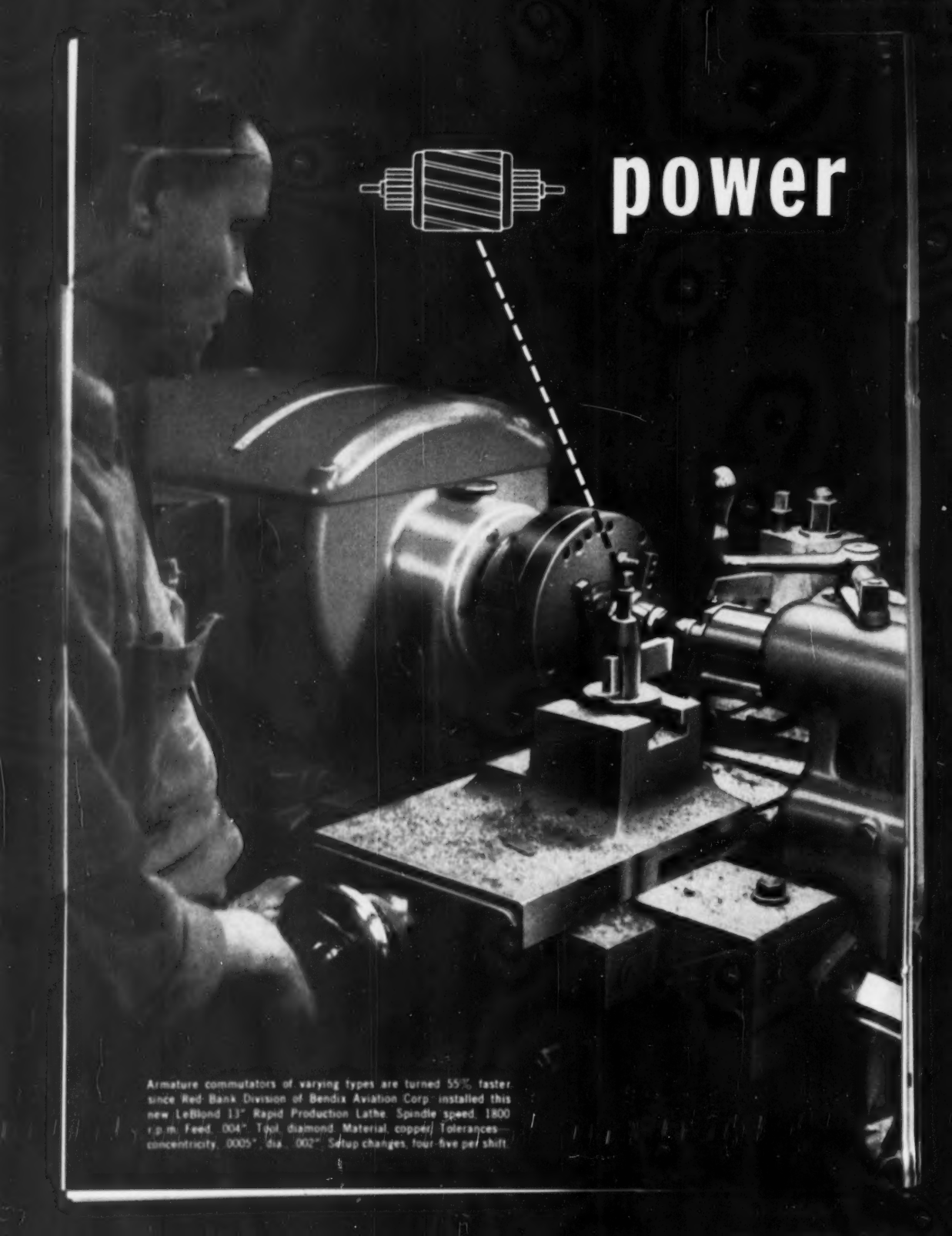


DURING WORLD WAR II, *Lo-swing* **Lathes demonstrated their productiveness and stamina on a wide range of Ordnance Work... 40, 75, 90, 105, 155, 220 and 240 mm Shells—50 and 81 mm Trench Bombs—20, 40 and 105 mm Gun Barrels—camshafts, cylinder sleeves, radial aircraft cylinders, landing struts, large diesel engine cylinders, etc. The Model CS Centering Machine was used extensively on 75, 90 and 105 mm Shells.**

SENECA FALLS MACHINE CO., SENECA FALLS, N. Y.

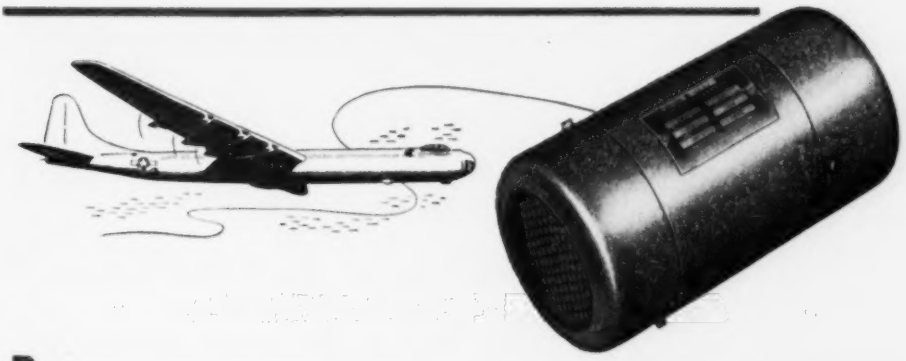
- *Lo-swing* **IMP Lathe. Fully automatic, for small diameter work at high speeds.**
- **Model LR** *Lo-swing* **Lathe. Fully automatic, for medium sized work.**
- **Model AR** *Lo-swing* **Lathe. Fully automatic, for medium and large size work.**
- **Model R-14** *Lo-swing* **Lathe. Fully automatic, for large size work.**
- **Model AP** *Lo-swing* **Lathe. Semi-automatic, for work requiring long carriage travel.**
- **Model LS** *Lo-swing* **Lathe. Semi-automatic for turning long gun barrels and heavy shells up to 13" in diameter.**
- **Model CS Drilling and Centering Machine. Fully automatic for all centering operations.**

Lo-swing AUTOMATIC LATHES



Armature commutators of varying types are turned 55% faster since Red Bank Division of Bendix Aviation Corp. installed this new LeBlond 13" Rapid Production Lathe. Spindle speed, 1800 r.p.m. Feed, .004". Tool, diamond. Material, copper. Tolerances—concentricity, .0005", dia., .002". Setup changes, four-five per shift.

for an airplane's eyes and ears



Power for vital radar and communications equipment in airplanes is supplied by dynamotors like this. They're made in dozens of types and sizes to provide precise, unfailing power for the variety of electronic accessories used in modern aircraft.

Heart of the dynamotor is the armature. Its commutators require turning to high degrees of finish and accuracy for dependability under all flight conditions. For this job Red Bank Division of Bendix Aviation Corp. needed a precision production lathe, versatile enough to handle the entire range of sizes without costly setups. They installed a new LeBlond 13" Rapid Production Lathe ... recommended by the LeBlond New York Office. Result? *Production increased 55%.*

This LeBlond Lathe makes possible high-production turning of a *variety* of work within the range *you* choose. It offers your choice of two geared and one motor headstock with various speed combinations from 68 to 3600 r.p.m., feeds from .001" to .064". A score of attachments is available.

Whether you turn tiny armatures or ten-ton shafts, there's a LeBlond Lathe to turn them faster, better. Your nearby LeBlond Distributor will tell you about the 13" Rapid Production and other late models. Call him or write . . .

THE R. K. LEBLOND MACHINE TOOL COMPANY, CINCINNATI 8, OHIO

Ask for Bulletin RP-201 E for more information on the 13" Rapid Production Lathe.

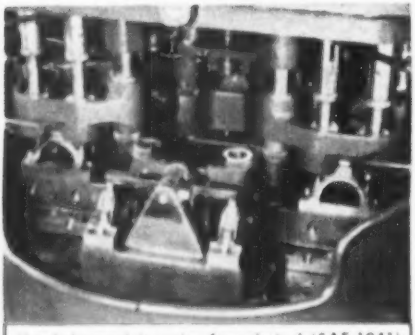
turned faster by

LeBLOND
of Cincinnati

WORLD'S LARGEST BUILDER OF A COMPLETE LINE OF LATHES • FOR MORE THAN 63 YEARS



The Buyer Gets a Better Value ...with an assist by MORRIS ENGINEERED PRODUCTION



Hand-clamped in pairs, forged steel (SAE 1041) connecting rod caps are rough spot faced, finished spot faced and countersunk (a total of twelve operations on the two parts) at a rate of one part every 8 seconds!



Automotive Connecting Rod Cap — Two Views

In the auto plant or in the showroom . . . it's an American trait to want quality at a price. The manufacturer gets it in a MORRIS Engineered Production Machine . . . for a better product at less cost . . . and passes it on to the buyer in a mass produced car.

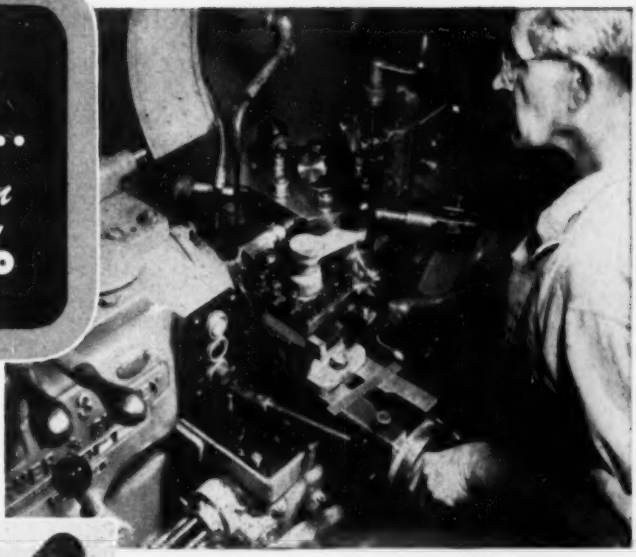
MORRIS Production Machines cut time and costs wherever multiple drilling, reaming, tapping, boring or similar operations are performed. In addition, a major plus feature is offered, namely, all machines are built from standard units to do a special job . . . a real savings in initial costs.

THE MORRIS MACHINE TOOL COMPANY

934 Harriet Street • Cincinnati 3, Ohio

"A better product at less cost with MORRIS ENGINEERED PRODUCTION."

JOBS EASIER... *Production up* 43%



The O. M. Edwards Co. does all these jobs on its No. 3 Warner & Swasey. Materials range from alloy steel forgings to hard bearing bronze. Lots vary from 8 to 1500 pieces. Average production has increased 43%.



THE O. M. EDWARDS CO., INC., of Syracuse works in hard metals such as nickel silver, specializing on accurate parts for the trap doors, retractable steps and double glazed windows they supply for modern railroad equipment. They recently installed a new Warner & Swasey No. 3 Universal Turret Lathe. Here is what they found . . .

Their operators prefer to run the new machine because it takes less manual effort.

Close limits are held more accurately.

The parts have better finishes.

Small lots—1 to 10 pieces—handled as well as long runs.

There is an all-over average of 43% more parts produced.

Installation of modern Warner & Swasey Turret Lathe machines has proved profitable for the O. M. Edwards Co.—why not see how a new Warner & Swasey can help you? Call the nearest Warner & Swasey representative or write—

You can machine it Better, Faster, for less... with a Warner & Swasey

WARNER & SWASEY Machine Tools *Cleveland*

TURRET LATHES, MULTIPLE & SINGLE SPINDLE AUTOMATICS, PRECISION TAPPING AND THREADING MACHINES

TAFT-PEIRCE

GAGE BLOCKS





rate "A" in accuracy and convenience

Taft-Peirce Gage Blocks give you the ultimate in precision and long life. Made of the finest alloy steel; hardened and seasoned for wear and permanence; ground and lapped with high precision to a super-smooth and flat surface . . . these characteristics are your guarantee of longer wear-life.

For your extra convenience, each block has its size plainly marked on the edge . . . a real time saver in selecting the right block every time. The compact mahogany case is so built that each block tilts into selector position at finger-tip pressure.



Set No. 82-A

Includes 81 standard sizes plus an extra block of .10005" which is extremely useful for checking in half-tenth combinations where tolerances are close. Price complete $385.

Set No. 35-A

A smaller set of 35 blocks — yet adequate for the most commonly used combinations. Price complete $200.



To add extra life to your Gage Blocks, two Tungsten Carbide Wear Blocks are available. These can be wrung to either side or both sides of a combination, to take the wear and tear of working contact. Both .050" and .100" Wear Blocks are priced at $20.00 each. Set of two in Mahogany case $40.

for additional information write:

THE TAFT-PEIRCE MANUFACTURING COMPANY

WOONSOCKET 1 RHODE ISLAND



CHEER UP!

THE

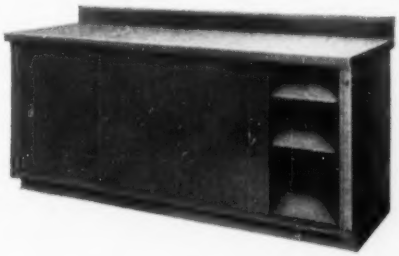
HALLOWELL

CABINET BENCH

is worth waiting for . . .

The HALLOWELL Cabinet Bench has more "custom" features than any other stock bench we know of. All-steel construction, several top materials, ample storage space, standarized multiple units and accessories and true good looks make it well "worth waiting for."

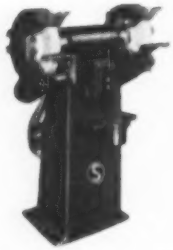
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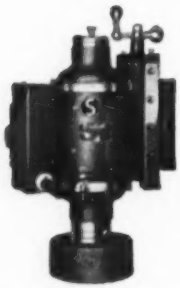
-SPS STANDARD PRESSED STEEL CO.

JENKINTOWN 22, PENNSYLVANIA

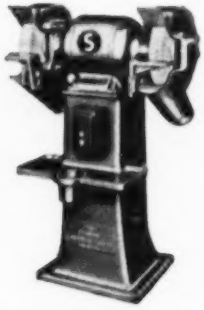
TOOLS FOR EVERY SHOP!



TYPE BDG. Single speed 1 H.P. 10" to 50 H.P. 30". Also multiple speeds for maintaining peripheral speeds as wheels wear.



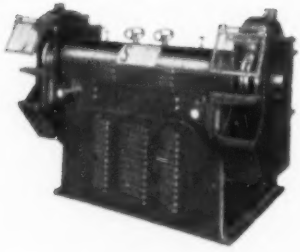
TYPE PAV. Vertical spindle grinders. Easily mounted on planers, boring mills, shapers, milling machines, etc. ½ H.P. to 10 H.P. Speeds 3600, 1800, 1200 R.P.M. with or without feeds.



TYPE FAS. Equipped with push button safety starter, tool tray and water pot, adjustable wheel guards, spark breaker and work rest. 1 H.P. to 7½ H.P.



TYPE TD heavy duty twin wheel tool grinder (Also single cup wheel) 10TD 10" and 14TD 14". For carbide, stellite, or high speed steel tools. Floor space conserved by placing grinder against wall. No time lost between rough and finish grind. Positively no spray or splash when grinding wet.



No. 35 Snagging grinder. Peak efficiency. Saves time—saves wheel costs. Each operator independent of the other. 9500 S.F.P.M. can be maintained on resinoid bond wheels down to wheel flanges by adjusting wheel guards through "Hand Wheel"! No gears or belts to change. Positive interlocking control—wheels cannot be over speeded. Two 5, 7½ or 10 H.P. motors for wheels from 20" x 30" in diameter, other sizes up to 100 H.P.

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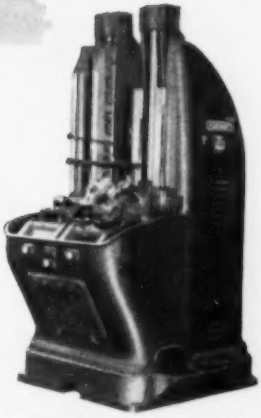
THE STANDARD ELECTRICAL TOOL CO.

2487 RIVER ROAD **CINCINNATI 4, OHIO**

investigate

surface broaching

for difficult machine work



Duplex Surface Broaching Machine. Made in 5, 10, 15 and 25 Ton Sizes.



Single Slide Surface Broaching Machine. Made in 5, 10, 15 and 25 Ton Sizes.



Continuous Type Broaching Machine. Made in 4 Sizes.

Many types of work can be surface broached on Footburt machines at remarkable savings over previous machining methods. High production is obtained with required accuracy and finish. Holding fixtures are designed for quick, convenient loading. Cutting tool maintenance costs are low. We will be glad to work with you on the application of surface broaching.

THE FOOTE-BURT COMPANY • Cleveland 8, Ohio
Detroit Office: General Motors Building

FOOTBURT surface broaching

. . . a time tested line of machine tools

Just 1/2 the time...

PREVIOUSLY...



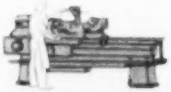
TWO MEN...

TWO LATHES...

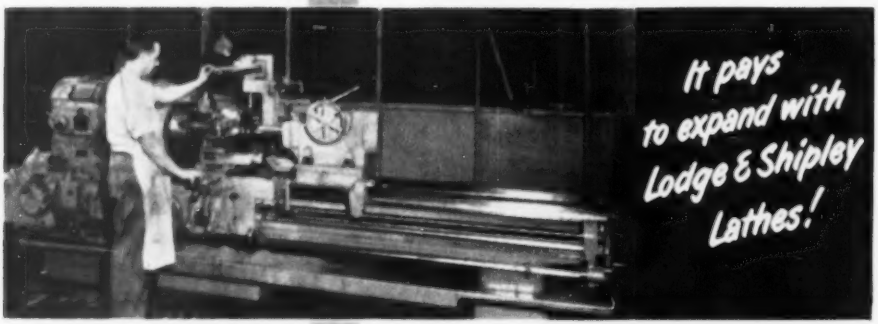


NOW...

ONE MAN...

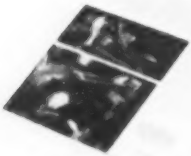


ONE LODGE & SHIPLEY COPYMATIC



WRITE FOR THIS INFORMATIVE ARTICLE...





in **WESTERN METALS** Magazine
Written by
JOHN C. BUCHANAN
V.-P. in Charge of Mfg.
Norris Stamping & Mfg. Co.
Los Angeles, Calif.

a reprint of Mr. Buchanan's full length article describing in detail methods and savings obtained with the COPYMATIC on this job is available on request

Featured in an article in Western Metals magazine, here's another highly successful COPYMATIC installation: Saves 50% on production time . . . "one man handles all the jobs on the COPYMATIC," saving not only manpower but also time and tied-up machinery, says John C. Buchanan, Vice President of Norris Stamping and Manufacturing Company.

The COPYMATIC Lathe is used by Norris to machine and redress high-chrome, high carbon auto rim rolls with the unbelievable hardness of 62 to 65 Rockwell C.

The double advantages of the COPYMATIC . . . speed of hydraulic duplication plus Model X engine lathe versatility . . . make it a profitable producer for any size shop. Write for detailed literature now.

THE **Lodge & Shipley** COMPANY

MACHINE TOOL DIVISION • 3057 COLERAIN
SHOREMASTER DIVISION • 800 EVANS ST.
CINCINNATI 25, OHIO


CALL DoALL
for precision
GROUND FLAT STOCK!
GREATEST SELECTION AVAILABLE ANYWHERE!
OVER 200 SIZES
IMMEDIATE DELIVERY
FROM LOCAL DoALL SALES SERVICE STORES!
DoALL "Uni-Form" high quality *oil hardening* tool and die steel is part of DoALL's line of industrial supplies sold and serviced by trained specialists giving personalized service from local DoALL stores. Write, wire or phone today.
The DoALL Company, 254 N. Laurel Ave. DES PLAINES, ILL.
DoALL
Contour Sawing Machines . . . Surface Grinders . . . Gages . . . Industrial Tools and Supplies

VAN NORMAN

Reduce Idle Machine Time...

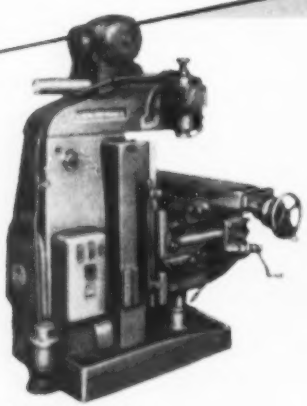
There's A Size To Meet Your Exact Requirements

Manufacturers in all types of industries step up milling production, minimize errors and cut costs per man and machine-hour with Van Norman Ram Type Millers.

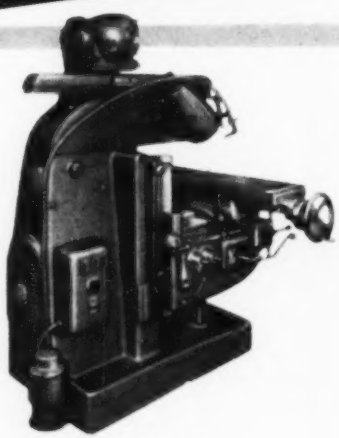
These versatile millers enable you to perform any and every milling job from horizontal to vertical . . . simply by positioning the adjustable cutterhead. This means *one* machine gives you the work range of several types of single purpose millers.

In addition, Van Norman Ram Type Millers save time because most jobs can be carried through to completion without changing the work set-up.

See for yourself how these machines cut costs, improve accuracy and increase production in the tool room, machine shop, laboratory and pattern shop. Their adaptability makes them ideal for maintenance and repair work. They are available in a wide range of sizes . . . for every milling requirement. Write for information.



Model No. 22L
Table size: 45" x 10"

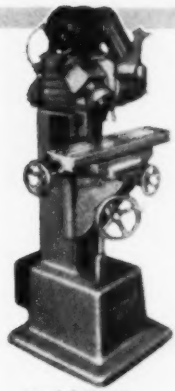


Model No. 26
Table size: 58" x 13"

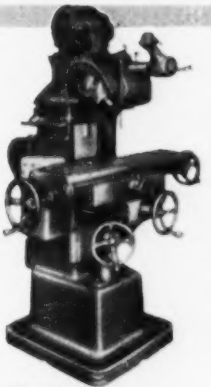
VAN NORMAN COMPANY

Ram Type Millers

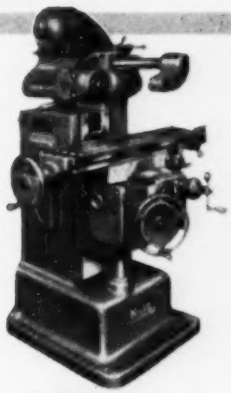
Cut Costs on All Types of Milling



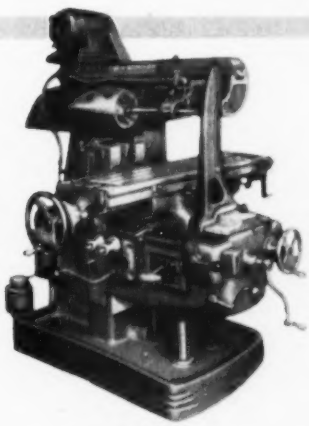
Model No. 6
Table size: 30" x 6⅞"



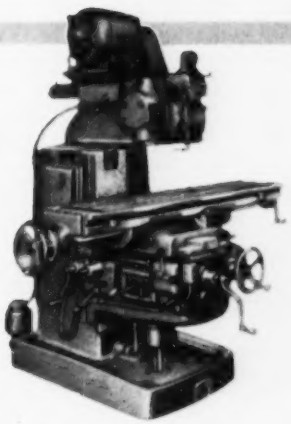
Model No. 12
Table size: 37½" x 9⅜"



Model No. 16
Table size: 37" x 9½"



Model No. 36
Table size: 64" x 14"



Model No. 38
Table size: 64" x 14"

SPRINGFIELD 7, MASSACHUSETTS

Model SA

ROCKFORD HYDRAULIC SLOTTER

CUTS SLOTTING TIME FROM 3 HOURS TO 55 MINUTES

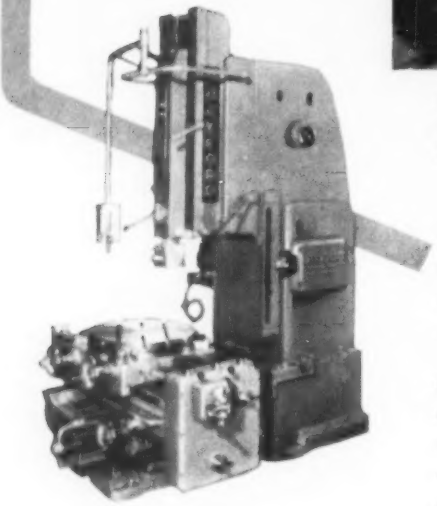
GISHOLT MACHINE COMPANY says:

"We formerly worked the slot from each end of the piece. Cutting time was 3 hours."

"We are now doing the same job with one set-up in only 55 minutes."



Single operation shapes internal keyway 1.250" wide x .005" 11/16" deep and 16" long. Total cutting time is 55 minutes, a saving of 125 minutes over former time. Work piece is cast iron Pedestal Carriage for Gisholt Dynamic Balancing Machine.



20" stroke Rockford Hydraulic Slotter, complete with Rockford Slotter Vise and Angle Plate, cuts slot at 40 feet per minute with .004" feed per stroke. Previous method required 3 hours and two cuts, one from each end of the keyway.

● Large irregular pieces, internal surfaces, angular or rotary cuts — all are handled with ease on new SA Hydraulic Rockford Slotters.

Cutting speeds are selected from the pendant. Hydraulic cross, circular and longitudinal feeds provide flexibility. Many other improved engineering features offer you new production short cuts for slotting work.

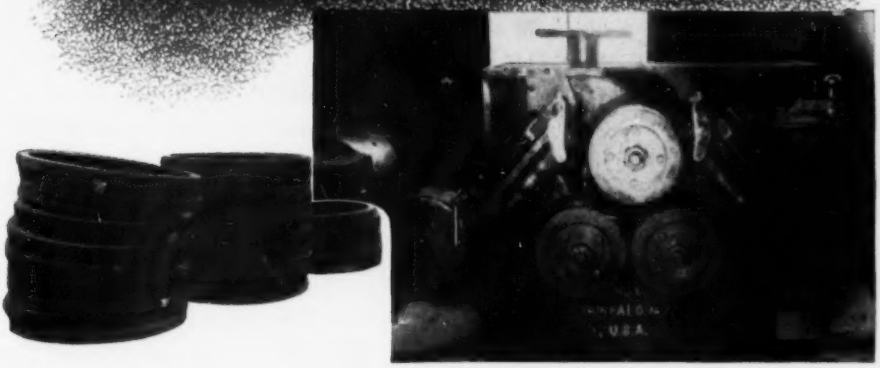
Ask a Rockford representative to show you these advantages. Send for a copy of Bulletin 601C.

Hy-Draulic

ROCKFORD MACHINE TOOL CO.

2500 KISHWAUKEE STREET ROCKFORD, ILLINOIS

THE PORTLAND COMPANY ROLLS OUT THE *Rush Jobs*



--- and Rolls 'em out Accurately with this "Buffalo" BENDING ROLL

The Portland Company, Boilermakers, Machinists and Founders, Portland, Me., has a reputation for prompt, accurate work. One reason is this "Buffalo" No. 1 Vertical Roll. "All in a day's work" recently was an order for 94 rings of 36½" outside diameter, rolled leg-in from 2" x 2" x ¼" angle. Left top photo is a partial group of the rings, completed on time, as usual.

If you bend angles, tees, flats, pipe, channels and other structurals into curved shapes, you're always money and time ahead with a "Buffalo" Bender. Rolls are changed quickly for different jobs, and one man can easily produce his payload and then some. If you're looking for lower metal bending costs, write for Bulletins 352-B and 344-A for all information.

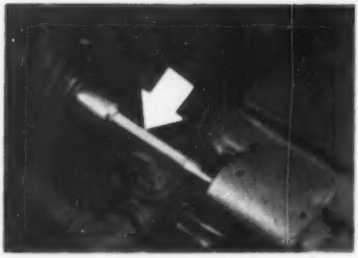
BUFFALO "Buffalo" FORGE COMPANY

388 Broadway Buffalo, New York

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

DRILLING PUNCHING CUTTING SHEARING BENDING

THESE POWER DRIVE PROBLEMS ARE "DUCK SOUP" FOR S.S.WHITE FLEXIBLE SHAFTS

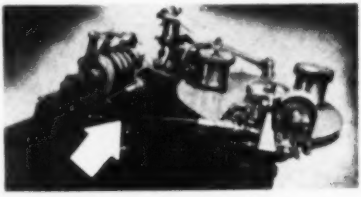


← MISALIGNMENT

When misalignment is a factor, as in this adjustable pulley drive on a large turret lathe, an S.S.White flexible shaft provides a positive, vibrationless drive which eliminates the necessity of accurately aligning the coupled spindles.

CURVES →

When power has to turn corners, as in this sock darning machine, a single S.S.White flexible shaft is all that's needed, because it's especially designed to transmit power in paths other than straight lines.





← ADJUSTABILITY

As in this saw sharpening machine, the non-rigid construction of an S.S.White flexible shaft allows the driven member to be set in a wide range of different operating positions.

WRITE FOR NEW BULLETIN 5008

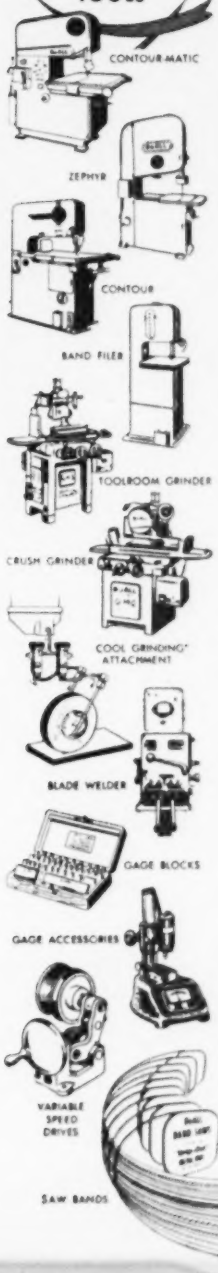
It contains the latest information and data on flexible shafts and their application. Write for a copy today.



THE S.S.White INDUSTRIAL DIVISION
DENTAL MFG. CO.

Dept. 5, 10 East 40th St.
NEW YORK 16, N. Y.

DoALL
INDUSTRY'S NEW SET OF TOOLS



"BURR-PROOF"

Reg. Trade-mark

IS THE NEW EXCLUSIVE FEATURE OF

DoALL GAGE BLOCKS





DoALL "BURR-PROOF" GAGE BLOCKS

The Secret of "Re-Rounded" Edges

Now, without added cost, you can have the new DoALL "BURR-PROOF" gage blocks that last twice as long as other standard blocks. Think of the great savings in replacement costs, fewer rejects and better quality products! Developed and used exclusively by DoALL, burr-proofing is the latest major achievement in gage block history. It "re-rounds" the edges of the blocks to prevent formation of microscopic burrs caused by ordinary usage. Burred edges are a major reason for discarding gage blocks—even a burr only 2 millionth inch can make a block unsuitable.

Although gage makers round the edges of the blocks to prevent burrs, the purpose of rounding is defeated by final lapping, which produces unwanted sharp edges. These become burred by the slight shocks and jars of normal handling. Mechanical operations to re-round the edges after lapping are avoided as they invariably cause distortion. Therefore the sharp edges left have been tolerated as a necessary evil—until the new DoALL process that "re-rounds" edges *without* distortion.

Part of DoALL'S Integrated Inspection System

All DoALL gage blocks are burr-proofed. They are the key units of the integrated inspection equipment that DoALL manufactures for industry.

DoALL Makes the World's Finest Gage Blocks

The DoALL Store near you has a Gage Specialist at your service. Write for proof of DoALL Gage Block superiority today.



The DoALL Company
Des Plaines, Ill., U.S.A.
Cable Address: DoALL, Des Plaines

DoALL Stores in Key Cities

Factory Trained Representatives Everywhere



Hi-Speed rotary filing of metal pattern

When Patterns are Finished the Haskins Way

When you file and finish metal patterns with Haskins Flexible shaft equipment, you get the precision craftsmanship that assures quality production. Designed to speed pattern, die and mold finishing, Haskins HS-4 equipment—½ h.p.—has a six-speed, Timken-bearing countershaft that develops up to 7800 r.p.m. Available with bench, pedestal or overhead mounting. The Haskins complete line of machines and attachments gives you the right combination for all grinding, sanding, filing, or polishing operations. Write today for complete information. R. G. Haskins Co., 2647 W. Harrison St., Chicago 12, Ill.



Overhead Suspension



Bench Mounted...



Pedestal Mounted...

haskins
FLEXIBLE SHAFT EQUIPMENT

HASKINS

One hour

1800 lbs.—rough



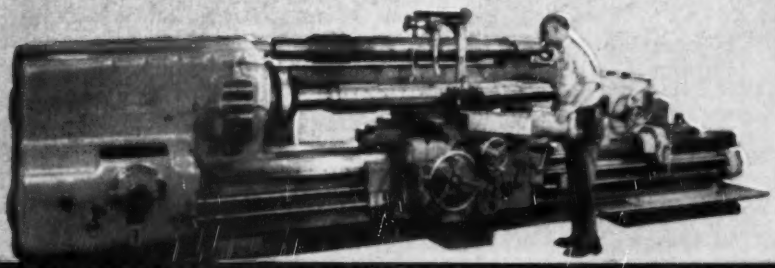
1300 lbs.—finished

One hour to finish turn this Diesel Locomotive Driving Axle from the rough forging, removing 500 pounds of chips and using 60 horse power cuts in the process.

This shows what a 25" "AMERICAN" Hydraulic Duplicating Lathe driven by a 50 H.P. motor can do. Production records of this kind are the rule rather than the exception and are being made daily.

"AMERICAN" Hydraulic Duplicating Lathes reduce machining time 50 to 75 per cent . . . cut costs to the bone . . pay good dividends on the investment.

Repeat customers vouch for this in the most convincing way.

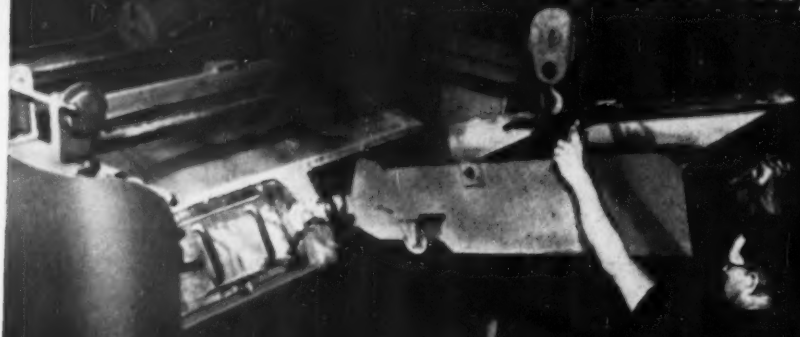


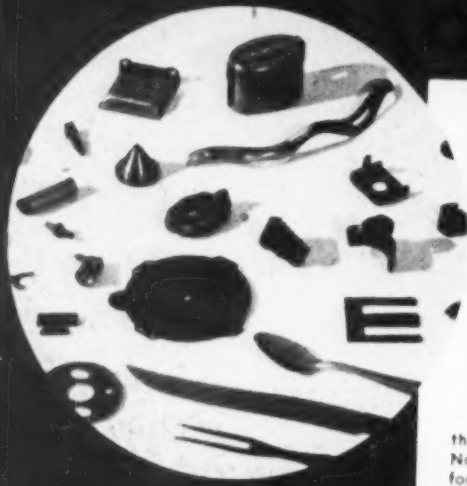
Bulletin No. 35 gives a complete description and shows many examples. It's yours for the asking.

THE AMERICAN TOOL WORKS CO. **Cincinnati, Ohio U.S.A.**

Lathes and Radial Drills

Are You Finishing Your Metal Parts *the Economical Way?*





YOU can remove objectionable heat scale, burrs, tool marks and dirt from your metal parts quickly and economically with the barrel finishing process and with ALUNDUM Tumbling Abrasive—the ideal barrel finishing medium. You can finish large quantities of parts to exact dimensions and degrees of surface finish and prepare them for plating — ALL IN ONE OPERATION!

If you don't have barrel finishing equipment in your plant, and if you would like to find out without obligation what this finishing process and this Norton product can do for you — Norton will be glad to make test runs for you.

NORTON COMPANY, WORCESTER 6, MASS.

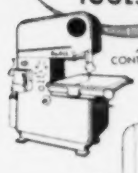
Distributors In All Principal Cities

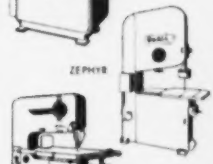
G-221

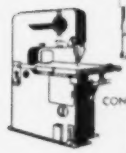
NORTON
ABRASIVES

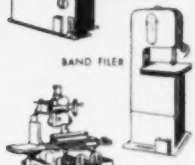
DoALL

INDUSTRY'S NEW SET OF TOOLS


CONTOUR-MATIC


ZEPHYR


CONTOUR


BAND FILER

TOOLROOM GRINDER


CRUSH GRINDER

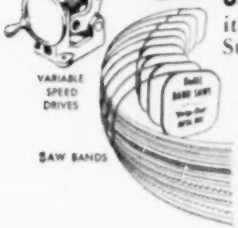
"COOL GRINDING" ATTACHMENT

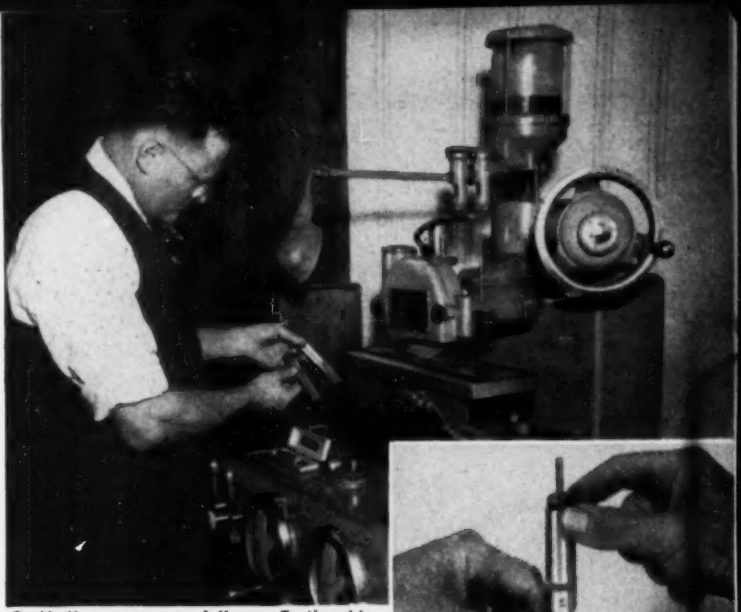

BLADE WELDER


GAGE BLOCKS


GAGE ACCESSORIES

VARIABLE SPEED DRIVES


SAW BANDS



G .N. Krouse, owner of Krouse Testing Machine Co., Columbus, Ohio, inspecting 5" micrometer scales after "Cool Grinding" on DoALL Model G-1 Surface Grinder. These scales with .001" taper from end to end are held to accuracy of .00002" (20 millionths of an inch). Their micrometers and scales are used to measure plating thickness.

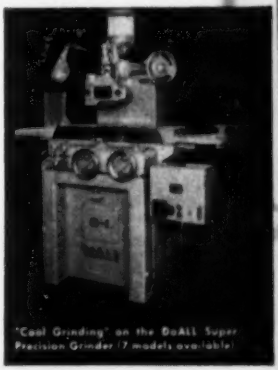
DoALL COOL GRINDING

U.S. Patent No. 2470350

(Coolant-through-the-Wheel)

This patented technique used with a DoALL Surface Grinder opens an entirely new grinding era—faster, more accurate, better finishes.

1. Cooler grinding temperature.
2. Full visibility of work. No mess.
3. Longer wheel life—less "loading," less frequent dressing.
4. Finer finish — no cracking, warping or "skin softness".
5. No special wheels required, no power consuming pumps, no space taking tanks.


"Cool Grinding" on the DoALL Super Precision Grinder (7 models available)

SEE HOW IT WORKS. Interesting because it's so revolutionary. Call your local DoALL Store today and ask for a demonstration.


TOOL STEEL


BENCH FILER



The DoALL Company

Des Plaines, Ill., U.S.A.

Cable Address: DoALL, Des Plaines

DoALL Stores in Key Cities

Factory Trained Representatives Everywhere



His right hand is on SKIL's exclusive, patented contour-grip handle—left hand covers the convenient nose knob of this SKIL Belt Sander. No awkward handling, no crowded, cramped fingers with SKIL Belt Sanders. Belt changes are made in seconds thanks to SKIL's "touch-control" lever. Finish sanding work goes fast and easy here on this stainless steel "Anets" 4-tube, 20" x 20" bakery fryer.

SKIL Saws

SKIL Sanders

SKIL Grinders

SKIL Sanders

SKIL Shear

SKIL Drills

SKIL Grinders

produce sparkling finishes

at Anetsberger Brothers, Inc.

SKIL Disc Sanders and SKIL Belt Sanders help increase sales-appeal of famous "Anets" Bakery and Food Serving Equipment

Look at the smooth, gleaming, ripple-free finish on each stainless steel "Anets" product. Note how these bright, shiny finishes add extra "buy-appeal"—assure effortless cleaning and maintenance. Think how easily, how economically SKIL Sanders can produce similar results in *your* finishing operations on metal, wood or compositions!

Like many other manufacturers of high quality products, Anetsberger Brothers, Inc., Northbrook, Illinois, have found SKIL Portable Tools fast, efficient, dependable. SKIL Belt and Disc Sanders, SKIL Drills, SKIL Screwdrivers and SKIL Saws *all* play an important part in production line and maintenance work in the large Anetsberger Brothers plant.

Ask your SKIL Tool Distributor to demonstrate SKIL Sanders and other famous SKIL Tools today!

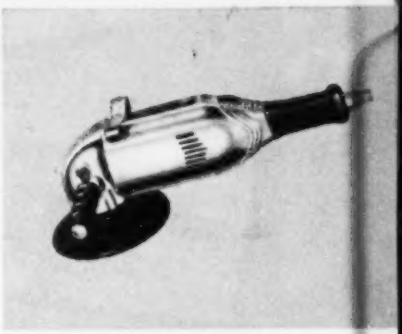
SKIL Products are made only by

SKILSAW, INC.

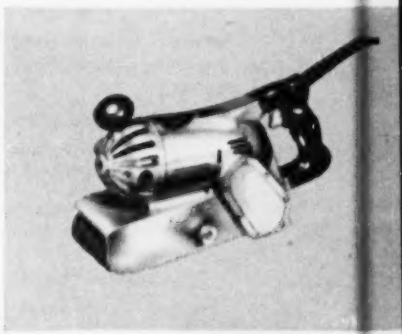
5033 Elston Avenue, Chicago 30, Illinois

Factory Branches in Principal Cities

In Canada: SKILTOOLS, LTD., 66 Portland St., Toronto, Ont.



SKIL Disc Sanders—6 powerful models



SKIL Belt Sanders—4 powerful models



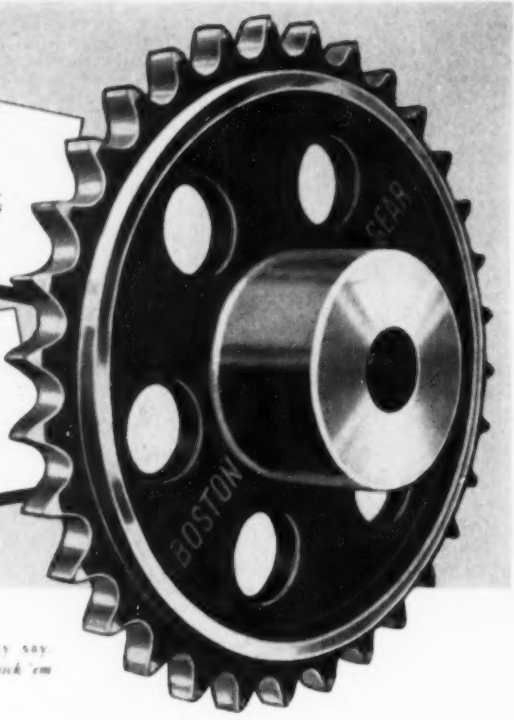
This "Anets" 14-inch restaurant fryer gets a fast, thorough polishing with a powerful SKIL Disc Sander. The wire brush takes good care of the "hard-to-reach" spots. SKIL Disc Sanders can easily solve *your* sanding, cleaning and polishing problem—*try one on your production line for proof!*

SKIL

PORTABLE TOOLS

WHY DOES A BOSTON Gear Sprocket...

PUT EXTRA MONEY IN YOUR Pocket?



"Sprockets are sprockets", you may say. *"Any old sprocket will do. Might as well pick 'em up cheap."*

But stop and think! Roller chain costs money—is **increasingly hard to get.** Cheaply made sprockets with carelessly cut teeth chew up chain **fast** — reduce its life 20% or more. Sprockets that do not run true — that lack balance and correct tooth formation — waste power, too.

Chain — power — cost of shutdowns for replacement — check these against the small "saving" in first cost between a "bargain counter" sprocket and a sprocket of genuine BOSTON *Gear* quality design, materials, workmanship, finish and accuracy. **BOSTON Sprockets are cut with the same care and precision as BOSTON Gears.**

With Sprockets as with Gears, Reductors, Ratiomotors, Bearings and hundreds of other items of transmission equipment, it pays to standardize on BOSTON — readily available from nearby stock.

80 Authorized BOSTON Gear Distributors Ready To Serve You



BOSTON Gear Sprockets and Chain cover a complete range of chain drive service from "fractional" power to forty horse power.



Boston Gear Catalog No. 33 contains complete information and prices on over 4000 stock items. Write for free copy.

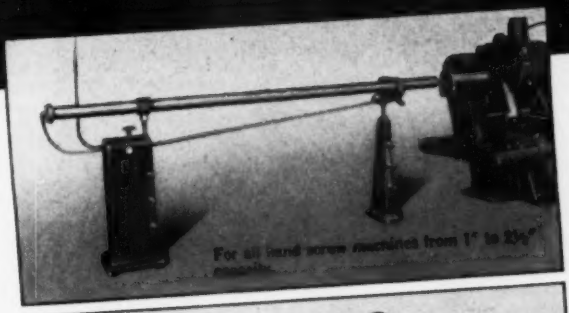
BOSTON GEAR WORKS

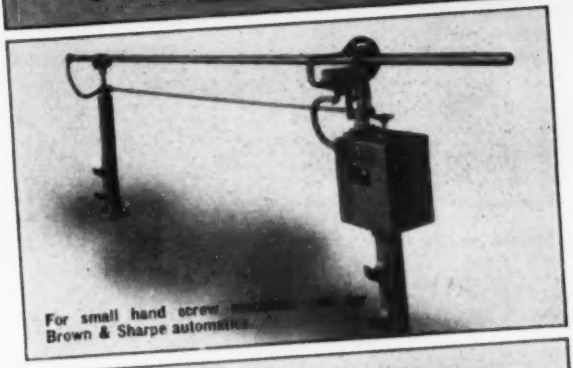
66 HAYWARD ST., QUINCY 71, MASS.



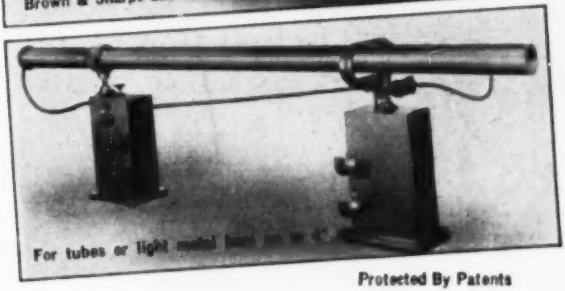
FEEDS AUTOMATICALLY

to the last possible remnant !





For small hand screw
Brown & Sharpe automatics



For tubes or light

Protected By Patents

Special heavy-duty machine for bar stock and tubing up to and including 8" dia., in standard lengths.

LIPE

PNEUMATIC BAR FEEDS

Actually, the Lipe Pneumatic Bar Feed does every part of the feed job except to replace the bar. And does it easily, automatically, rapidly and safely.

Gets More Out of Your Machine

- Operates on any machine tool where stock is fed through a spindle or having a fixed stock stop.
- Feeds stock bar automatically into spindle.
- Reloads easily.
- Permits use of exact size polished stock to save additional operations.
- Saves on rejects due to scratching, marring.
- Eliminates end whip.
- Bar feeds for standard bar stock up to and including 2½" dia.; and lightweight bars and tubing up to and including 4" dia.
- Safe and fool-proof. Eliminates feed fingers, feed finger tube, and all other parts related to feeding in the screw machine.

WRITE US TODAY

for complete descriptions and engineering data on Lipe Bar Feeds. No charge.

LIPE ROLLWAY

Lipe-ROLLWAY CORPORATION

Manufacturers of Automotive Clutches and Machine Tools

Syracuse 1, N. Y.

NEW HAUSER BURNISHING METHOD

Faster and More Accurate Than Any Other Lapping, Grinding or Polishing Method Known



HAUSER TYPE 241
Pivot Polishing Machine can be supplied with or without base, as desired

NOW AVAILABLE FROM U.S. STOCKS

HAUSER Type 241 Pivot Polishing Machine for Wet Polishing — 600 or More Pivots Per Hour

REPLACES CENTERLESS GRINDING

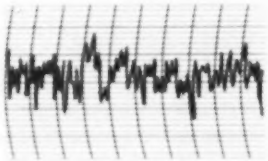
FEATURES:

- Polishes to 0.2 to 0.3 micro-inch R.M.S.
- High precision — Simple operation
- Low Cost Polishing
- Polishing range: Min. dia. 0.008" Max. dia. 0.197" Length to 0.315"
- Workpiece length to 5"
- Polishes straight, taper or radius
- Polishes shoulder at same time as cylinders at right angle or bevel as desired
- Polishes wide range of metals
- Takes work in collets or between centers
- Long life carbide or ceramic wheels
- Can be equipped with production-run time switch

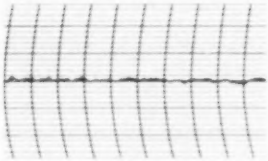
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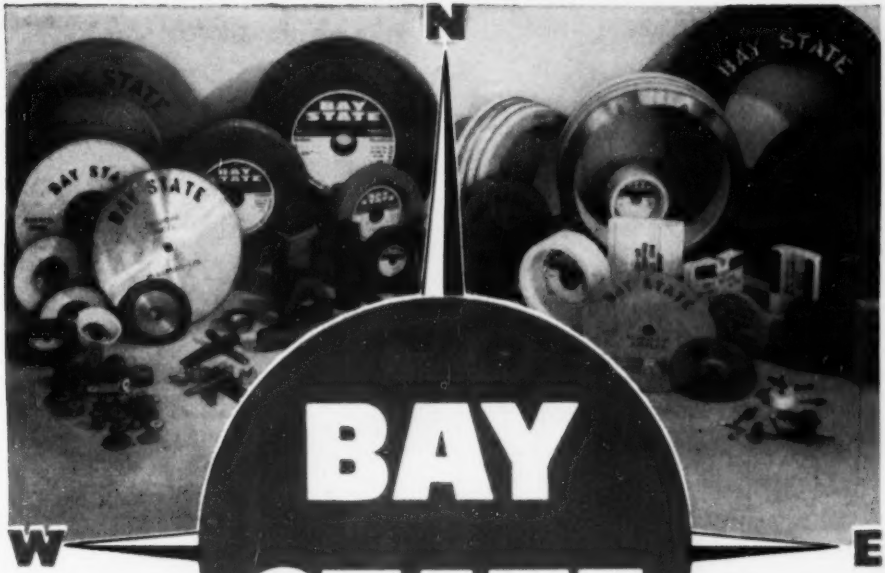
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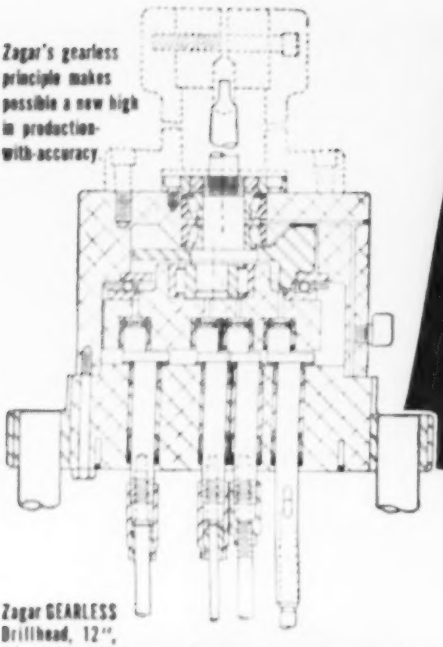
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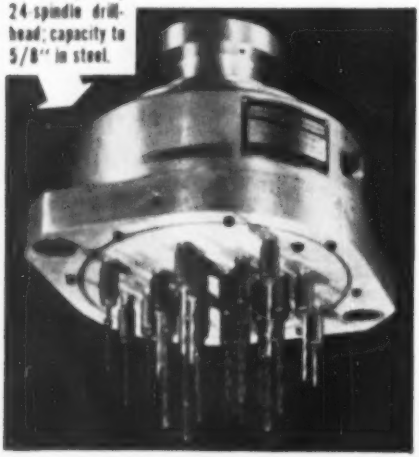


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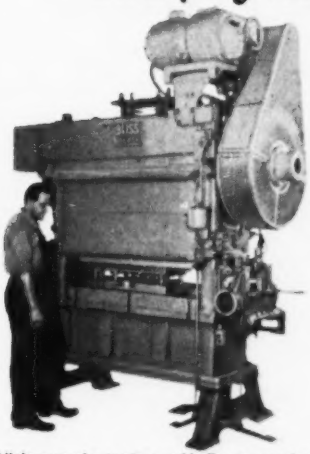
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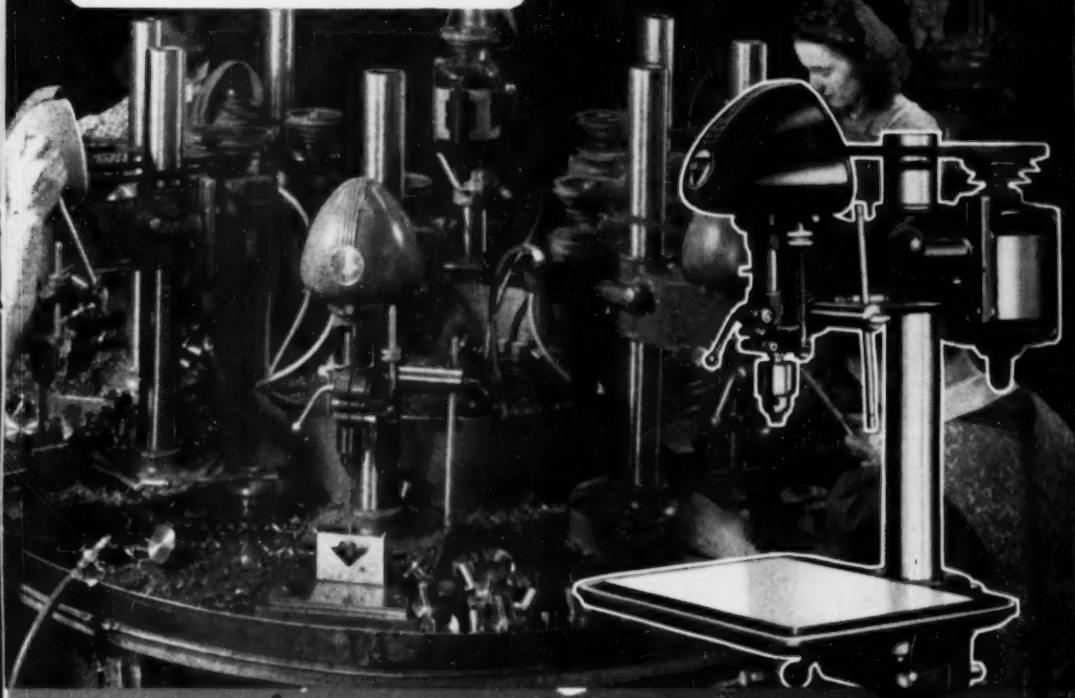
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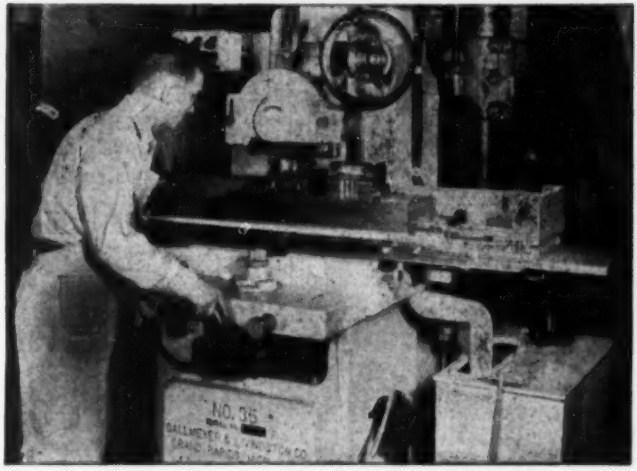
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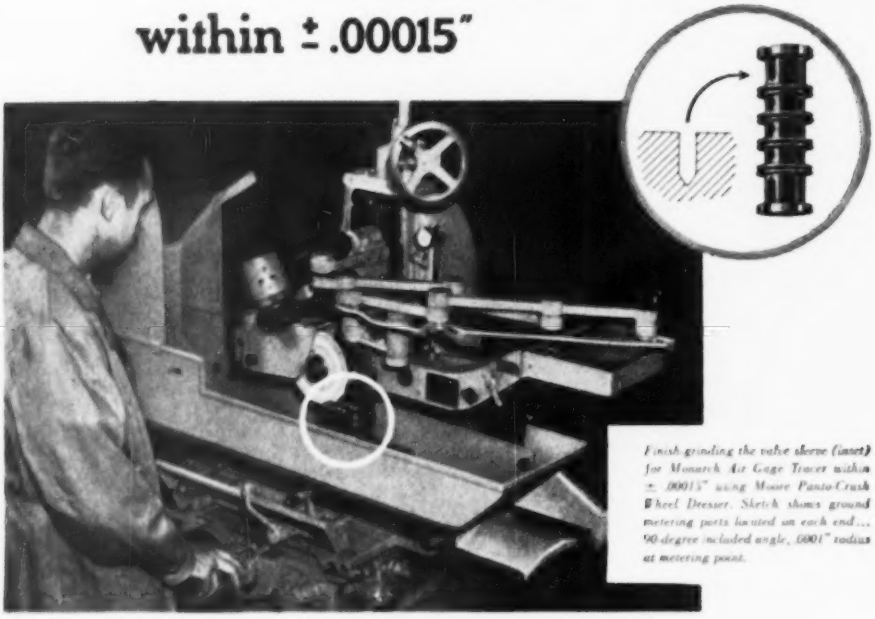
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Moore Wheel Dresser Keeps Monarch Air Gage Tracer Part within ±.00015"



Finish grinding the valve sleeve (inset) for Monarch Air Gage Tracer within ± .00015" using Moore Panto-Crush Wheel Dresser. Sketch shows ground metering ports located on each end... 90-degree included angle, .0001" radius at metering point.

1951's machine tools produce with unprecedented speed and accuracy because advanced tools fabricate their complex new operating features.

Like tracer-controlled duplication machining, pioneered by the Monarch Machine Tool Co. of Sidney, Ohio. Every component of the Air Gage tracer hydraulic valve for Monarch lathes is completed to tolerances ranging from .0001" to .0003" in what Monarch employees call their "Tenths Room".

An important part of this room is the Moore Panto-Crush Wheel Dresser*. Mounted on a surface grinder, it makes possible the finish grinding of the metering ports on each end of the valve sleeve. These ports have a 90-degree included angle with a ten-thousandths radius at the metering point. Depth must be held to plus or minus .00015".

No other method could accomplish this as quickly and accurately as the Panto-Crush Wheel Dresser. This unit *combines* crush-forming and diamond dressing. Either method is immediately available. Switching from one to another disturbs neither the work-setting nor the location of either truing device with respect to the wheel or workpiece.

Ask for literature describing the device in detail, including reprints of articles appearing in technical magazines.

*Another in a Moore Jig Borer.

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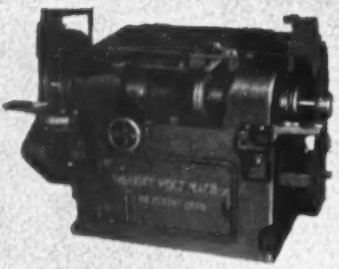
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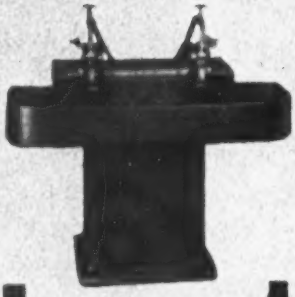
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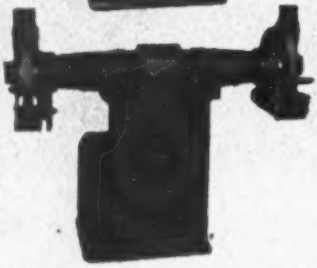
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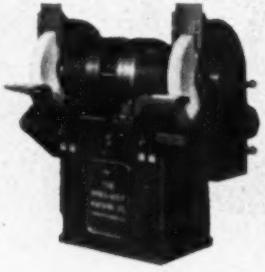
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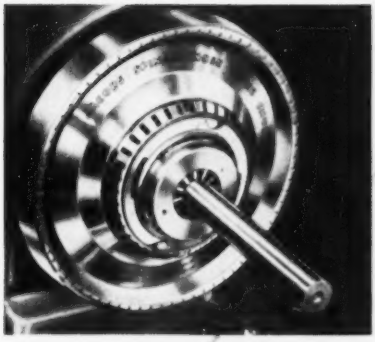






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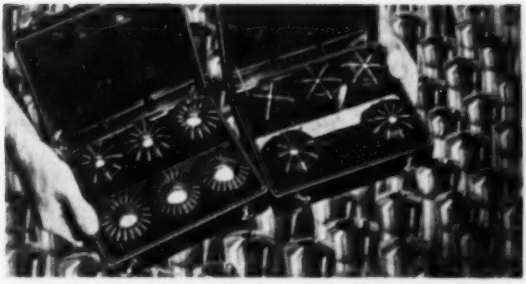
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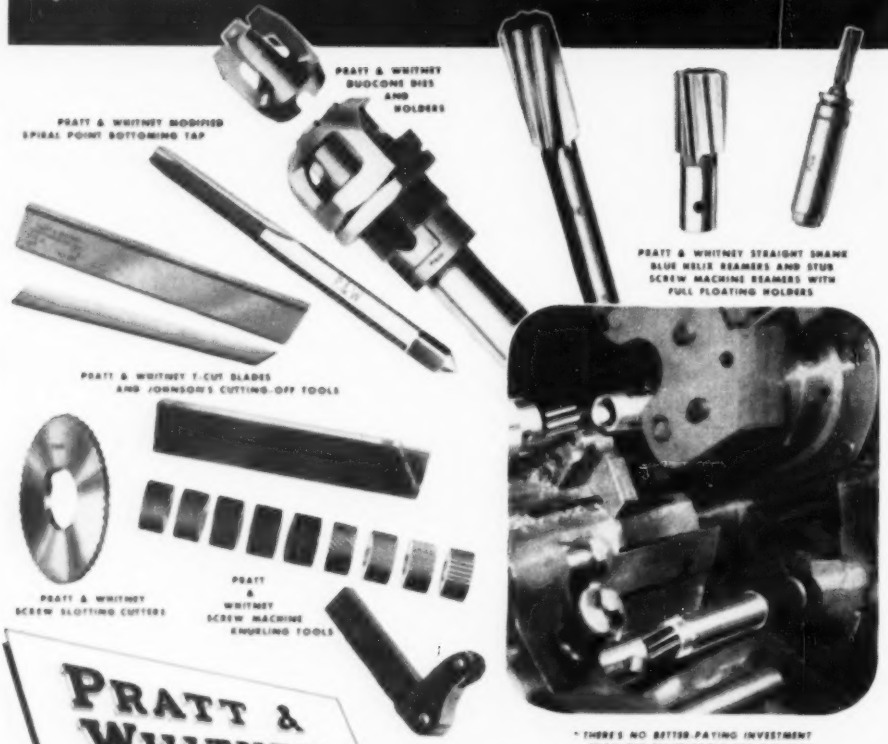
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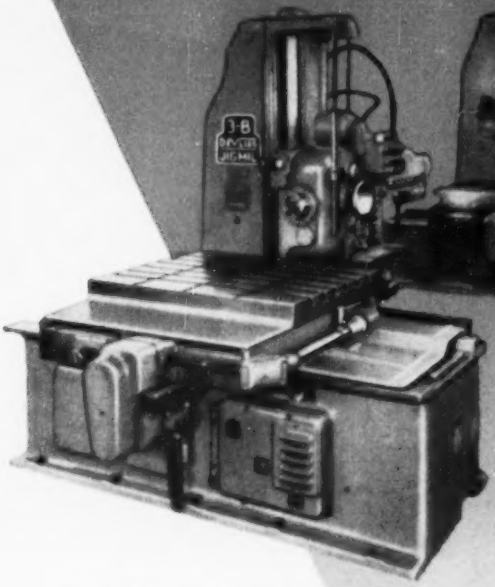
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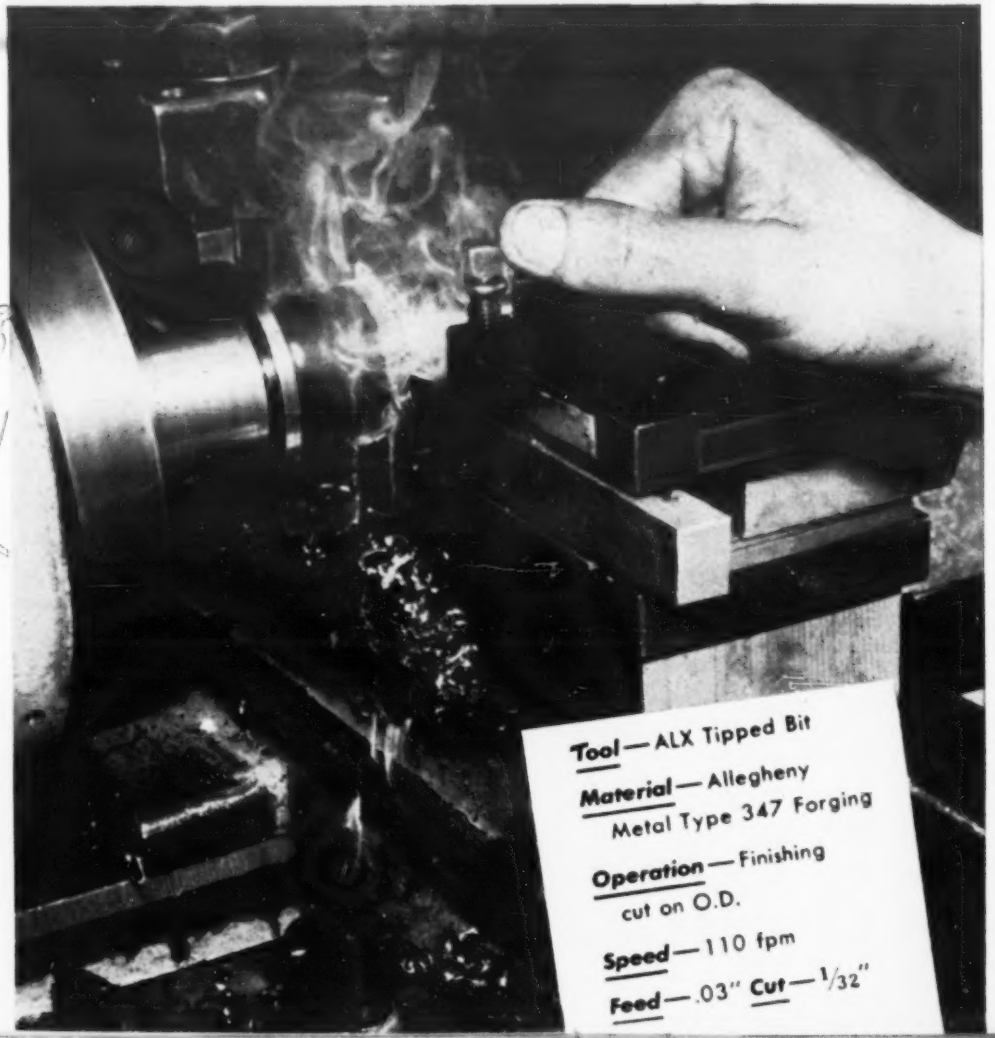
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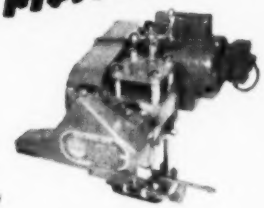
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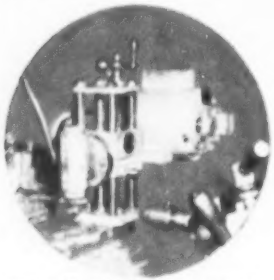


MILLING ON LATHE – Model "M" 1½ h. p. milling ½" keyway one foot per minute

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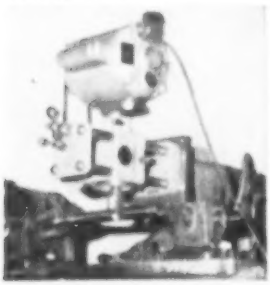


MILLING ON TURRET – Model "B" with 90° milling head mounted on rear cross-slide for keyways, slots, cross milling – completing part in turret

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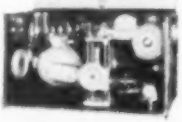
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Thor TOOLS

ASK FOR THE Silver Line



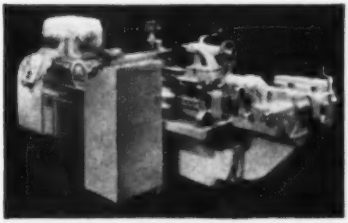
Get the Point?

You're looking at the stylus of a Monarch-Keller Form Turning, Boring and Facing Machine. Wherever you see an installation you'll get the point immediately—here's a shop using modern duplicating methods to reach peak production at maximum profit. Here's a shop reproducing template contours to tolerances of .001" or less. And here's a shop with work coming through *fast* (we can substantiate actual time savings of 400-500%!). It's a good point, if it's in *your* shop. But it's tough, if it's competition.

MANY ADVANTAGES are offered by this first of all tracer controlled turning methods—in which Monarch has now accumulated 21 years of experience.

Range and metal removing capacity are in no way limited by controls. It provides a unique universal stylus movement, thus effecting substantial time savings on many work pieces. It is recommended for the more intricate shaped molds and dies, for form rolls and for many intricately shaped parts.

Let us point out, too, that only Monarch can deliver your choice of three tracer controlled duplicating systems according to your needs. They are fully described in the three booklets mentioned in the coupon. Just indicate your interest, and we'll send you the ones you wish. *The Monarch Machine Tool Company, Sidney, Ohio.*



Monarch Series 60 Lathe with Monarch-Keller controls. These controls can be factory-applied to all Monarch Engine and Toolmakers Lathes, 14" size and up.



Push button control cabinet (above), electric tracer and magnetic clutches constitute system. It can be instantly disconnected for regular lathe work under manual control.

Monarch

ACCURACY • ECONOMY • LONG LIFE

TURNING MACHINES

FOR A GOOD TURN FASTER...TURN TO MONARCH

THE MONARCH MACHINE TOOL COMPANY, Sidney, Ohio

Gentlemen: Please send without obligation the following complete Bulletins:

☐ Bulletin No. 2401—Monarch-Keller Controls ☐ Bulletin No. 2606—The Monarch Air-Gage Tracer

☐ Bulletin No. 2302—The Monarch Motor-Trace

NAME _____ TITLE _____

COMPANY _____

ADDRESS _____

CITY _____ ZONE ____ STATE _____

for your BLANCHARD

So easy!

lower head onto wheel and clamp-



-then grind!

Blanchard wheels are engineered for Blanchard Grinding

The NEW Blanchard Wheel Holder eliminates sulphuring — try it with Blanchard wheels and be convinced that it will —

SAVE TIME
SAVE MONEY
SAVE TROUBLE

See your Blanchard distributor or write direct for full information!

PUT IT ON THE BLANCHARD

THE BLANCHARD MACHINE COMPANY 64 STATE ST., CAMBRIDGE 39, MASS., U.S.A.

HARDINGE
ELMIRA, N.Y.

PRECISION PRODUCTS
for
PRECISION PRODUCTION



60 Years of Experience

You get the benefit of 60 years' experience when you specify HARDINGE Collets, Feed Fingers and Pads . . . . . for your automatics, chucking machines and turret lathes.

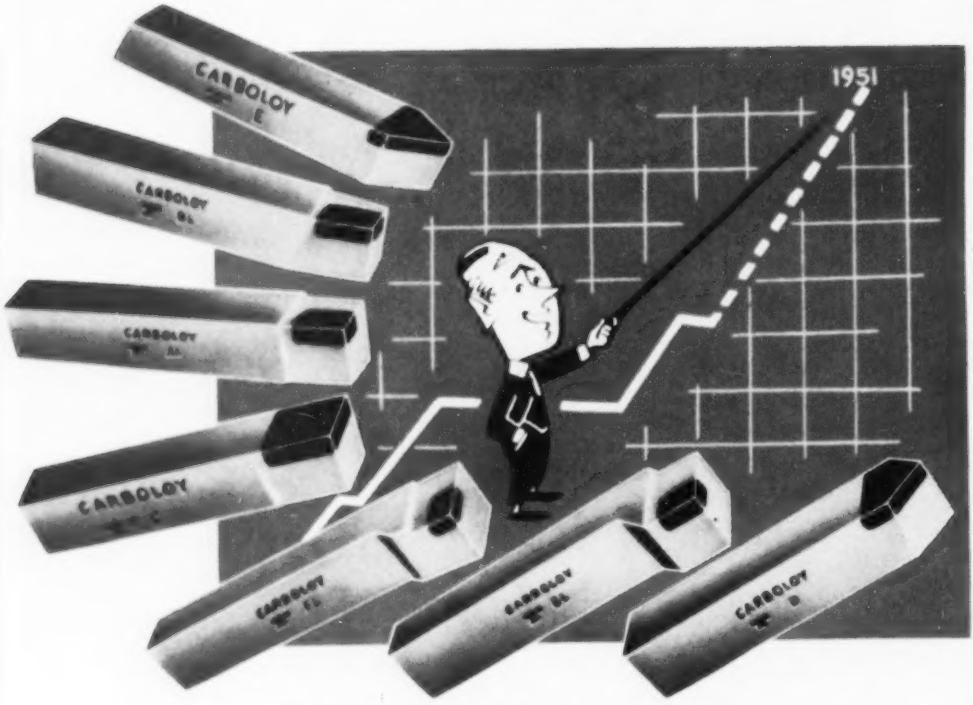
Manufacturing Collet, Feed Fingers and Pads

Sales Representatives in All Principal Cities

HARDINGE BROTHERS, INC., ELMIRA, N. Y.

"PERFORMANCE HAS ESTABLISHED LEADERSHIP FOR HARDINGE"

How you can get even



Only Standards give you—

ADAPTABILITY—can be quickly, economically ground in your own tool room to do up to 80% of your single-point tool machining! Eliminate the need for a large, costly inventory of special tools.

UNIVERSAL USE—can be used in lathes, boring mills, etc., to machine any metal or non-metallic . . . *unmatched performance* on steel cutting. Suitable for job lots or quantity production.

LOW COST—comparable in price to many high-speed steel tools and in many sizes actually cheaper. Mass-produced under rigid quality controls to give you the highest quality at low investment cost.

GREATER AVAILABILITY—Authorized Carboloy Distributors in 95 cities, coast to coast, normally stock Carboloy Standard Tools in commonly used styles and sizes.

SPECIFY CARBOLOY®
CEMENTED CARBIDE

"The least number of tools

greater productivity from carbide tools

3 valuable aids from Carboloy Company to help you increase efficiency, conserve tools



Carboloy Plan of Coordinated Carbide Control

The Carboloy "Triple C" Plan is a practical system proven in hundreds of plants for increasing production and conserving tools through properly coordinating all phases of carbide tool design, use and maintenance. This plan is easy to operate with your own personnel. Write today for your free copy of the "Triple C" Book, which explains this proven plan in detail.

Carboloy Tool Manual

This 200-page handbook of technical help on carbide tool design, application and maintenance is the most comprehensive, up-to-date manual ever offered on the technique of designing, using and maintaining carbide tools. Presented in easy-to-read, step-by-step technique to help you get even greater productivity from carbide tools. Your copy sent on request.





Carboloy Training Film

These 35-mm silent slide films (not motion pictures) are invaluable for plant training—refreshing older workers, instructing newcomers—to help them get the most from carbide tools. Films cover the material included in the Carboloy Tool Manual in easy-to-grasp, visual form. Available to you at approximate print cost. Free film catalog on request.

CARBOLOY COMPANY, INC.
A General Electric Affiliate
11143 E. 8 Mile Street, Detroit 32, Michigan

® The trade-mark "Carboloy" denotes manufacture by Carboloy Company, Inc.

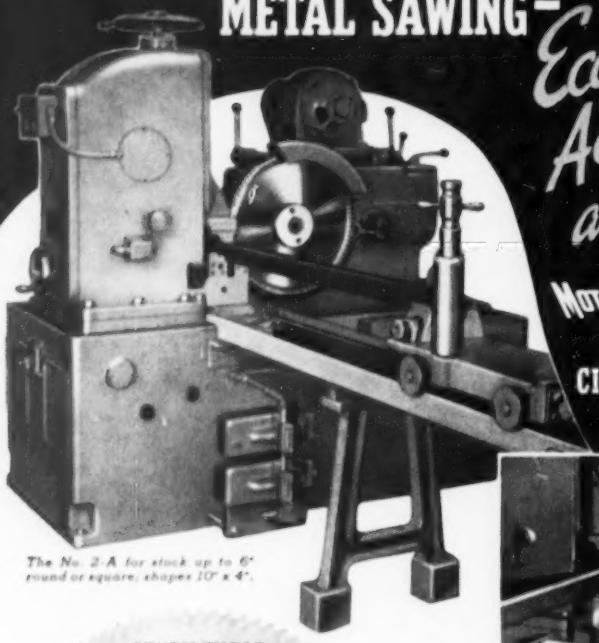
THE QUALITY BRAND OF
Standard Tools
for the greatest number of jobs"

14 OVER ~~15~~,000,000 USED BY INDUSTRY

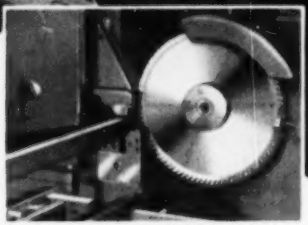
METAL SAWING—*Economical, Accurate and Fast!*

with

MOTCH & MERRYWEATHER AUTOMATIC CIRCULAR SAWING MACHINES



The No. 2-A for stock up to 6" round or square, shapes 10" x 4".



The No. 2-A features simplicity of set-up and no complication when changing from one job to another.

STUDY THESE CUTTING TIME FIGURES..

Size . . . . . 5" O.D. x 1/8" wall
Material . . . . . SAE 1020 steel
Cutting time . . . . . 28 seconds

★ ★ ★

Size . . . . . 7" x 3.860" x .450"
Material . . . . . Low carbon steel
Cutting time . . . . . 30 seconds

★ ★ ★

Size . . . . . 3" square
Material . . . . . C8815 steel
Cutting time . . . . . 39 seconds

★ ★ ★

Size . . . . . 6" diameter
Material . . . . . A5135 steel
Cutting time . . 1 min., 15 seconds

★ ★ ★

Ask our representative to give you additional data on the circular sawing method.

Round, square or shaped materials are handled with equal ease on Motch and Merryweather circular sawing machines. Ferrous and non-ferrous metals are cut off accurate to length, square, burrless, and with milled finish. Operation is entirely automatic. The "short line" to low-cost production is the circular sawing method — *with Motch & Merryweather circular sawing machines.*

WRITE FOR CATALOG 2-D.

Manufactured by

THE MOTCH & MERRYWEATHER MACHINERY COMPANY
715 PENTON BUILDING • CLEVELAND 13, OHIO
Builders of Circular Sawing Equipment, Production Milling, Automatic and Special Machines

PRODUCTION-WITH-ACCURACY MACHINES AND EQUIPMENT

Materials HANDLING EQUIPMENT

CUSTOM BUILT TO MEET YOUR NEEDS



Item S-878

Automatic END DUMP

Built ½ to 1½ cu. yds. cap. Use with lift truck or can be furnished mounted on wheels.



DRUM and BARREL TILT

Item B-731

$181.50

A barrel tilt for controlled, precision dumping or pouring. Ideal for chemicals, solvents, powders, etc. Turns 360° through worm drive. Equipped with two safety type locking devices and all steel, welded yoke. Hand-operated chain drive.



NS-298

$51.15

HAND DUMP TRUCK

Reinforced heavy sheet steel. ½ cubic yard, capacity—two 8" semi-steel wheels and two 4" metal swivel casters. Wt. 125 lbs.



Item NS-288

$60.75

BARREL and BOX GRAB

For picking up any type of wood or steel barrel, box or container, from 40" diameter down to small nail keg size. Will lift up to 2000 lbs.

UTILITIES RACK ON WHEELS

Item NS-415 M

(Roller bearing, 6" x 2", all metal wheels).

$67.75

Item NS-415R

(Ball bearing, 8" x 1½", rubber-tired wheels).

$70.20



UNIVERSAL GRAB

Item J-631 (1000 lbs)

$31.80

Item J-632 (1 Ton)

$39.10



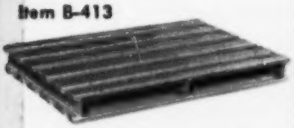
For picking up heavy boxes, crates, bales or other loads where hooks may be used. Heavy, forged steel hooks adjustable spread of from 16" to 48"

TRUCKS—SKID PLATFORMS—PALLETS—RACKS—WORK TABLES—BOX and BARREL GRABS—CART—BOXES—STORAGE BINS

We design and build all types of materials handling equipment...for pick-up, loading, moving, dumping or storage ...made of metal, or wood, or combination.

When Ordering Always give "item" number; this will help prevent error. All prices are f. o. b. Detroit. Prices are subject to change without notice.

Item B-413



ALL METAL PALLET

(*Double face*)

of special rolled steel for extra heavy duty—corrugated and reinforced with 3" channel supports. For power fork truck only.

Item S-911M Metal Wheels

$36.85



Item S-911R Molded on Rubber Wheels

$42.35

Item S-911P Pneumatic Rubber Wheels

$49.50

BARREL TRUCK

It Loads Automatically. Three style wheels metal, rubber or metal and pneumatic. Capacity 1000 lbs. 22" wide for narrow openings. Weight 85 lbs.

Palmer-Shile Co.

Backstand Method Saves Time!

Toledo Steel Tube Co. saves 2 hours per operator per day in finishing department

The Toledo Steel Tube Co. uses the backstand belt method to remove burrs and grip marks from the tubing. This company points out the following advantages of the backstand belt method over the set-up wheel method:

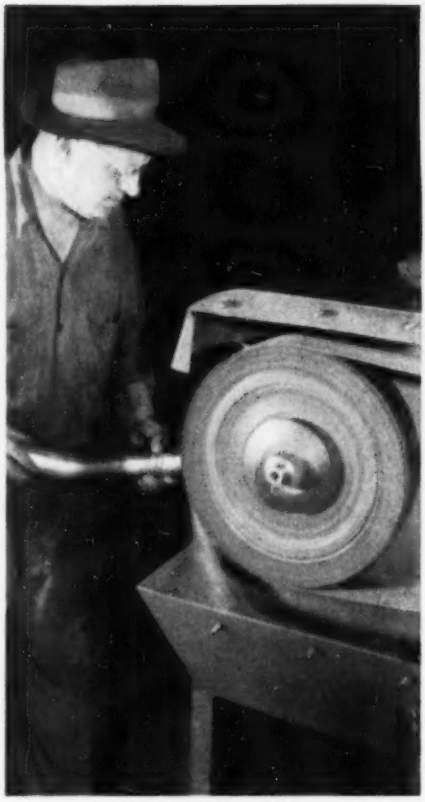
1. Time is not lost in making set-up wheels. Formerly the operators were given 2 hours a day for making their set-up wheels.

2. One backstand belt will outlast 4 to 5 set-up wheels for this application.

3. Belts maintain a flat surface for the grinding and polishing operation, whereas set-up wheels became rounded and needed dressing from time to time.

4. The uniform grit on the belts gives a much better finish on the tubes than did the rolled-on grit of the set-up wheels.

If you are grinding, polishing or finishing flat or contoured surfaces, cast pieces, stamped pieces or forged pieces, the backstand belt method can help you. Write today for our free booklet.



Mail this coupon today!

Please send me the booklet "Facts About Backstand Belt Grinding and Polishing."

Name .....

Title .....

Firm .....

Address .....

City ..... Zone ..... State .....

We recommend buying through your industrial distributor

ARMOUR

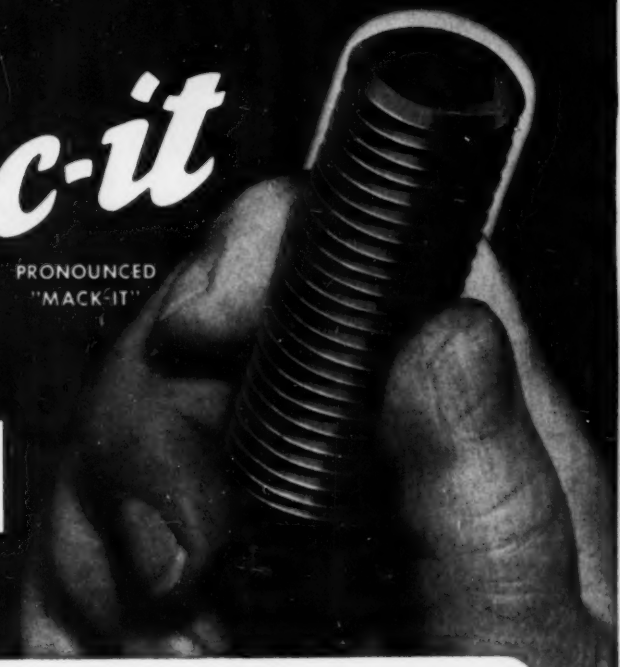
Coated Abrasives Division

SHEETS • ROLLS • BELTS • DISCS

Armour and Company
North Benton Road • Alliance, Ohio

IT'S A Mac-it

PRONOUNCED "MACK-IT"



Mac-it 3/8" x 2 1/2" Hollow Set Screws have grip of more than 17,000 pounds.

BETTER, FASTER SERVICE WITH THIS *Complete* MAC-IT LINE!

Because many standard types of Mac-its are stocked throughout the country for quick delivery, and because specials can be engineered to your own specifications, you'll find it pays to investigate Mac-its *first.*

Mac-it's 38 years' experience in the manufacture of heat-treated, alloy steel screws is your assurance of precision, uniformity and strength. Sold through leading industrial distributors from coast to coast and in Canada. Write for new catalog today!

Other Mac-it products include:

- Hollow Lock Screws
- Socket Head Cap Screws
- Stripper Bolts
- Hollow Pipe Plugs
- Socket Screw Keys
- Square Head Set Screws
- Hexagon Head Cap Screws
- . . . and many others

Marketed Nationally Since 1913 by

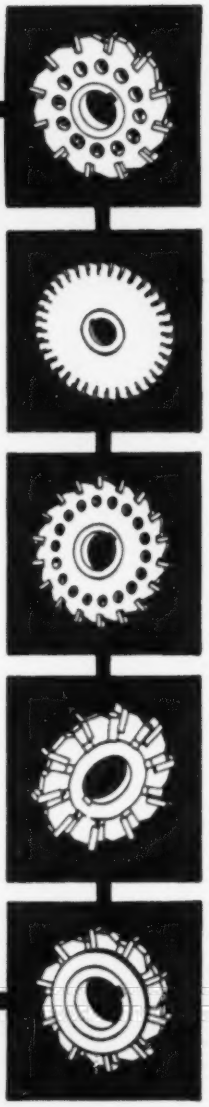
STRONG, CARLISLE & HAMMOND COMPANY

Cleveland 13, Ohio

Manufactured by MAC-IT PARTS COMPANY, Lancaster, Pa.

"S"
TYPE

for outstanding results on slotting & side milling!



Seldom, if ever, have so many milling production records been broken as by the NEW Lovejoy Type "S" Slotting and Side Milling Cutter! Its design is unique — the blades are inexpensive standard or pre-formed carbide blanks, held in the housing with a simple taper wedge — blade replacement and width and diameter adjustments are fast and simple — more teeth per tool are available than any other inserted-tooth cutter on the market! Now, your milling production is limited only by the stamina and power of your milling machines! Write for "S" folder giving full details, prices and stock sizes.

130 MAIN ST., SPRINGFIELD, VERMONT

LOVEJOY
TOOL COMPANY, INC.

SPEEDS UP OPERATIONS IN TOOL ROOMS . . . ON PRODUCTION LINES

DREMEL *Electric* MOTO-TOOLS



DOES THESE OPERATIONS BETTER—FASTER:

GRINDING
DRILLING
BURRING
POLISHING
DRESSING
SHARPENING
ENGRAVING
FINISHING

ELECTRIC DREMEL POWER TOOLS

MODEL 2 APPROX. 27,000 R.P.M.

MOTOR-TOOL KIT NO. 2 contains 23 accessories, including ***high-speed steel*** cutters and Model 2 Moto-Tool in natural finish hardwood case **$23.50**

MOTOR-TOOL NO. 2, with one emery wheel point **$16.50**

Dremel HIGH-SPEED STEEL CUTTERS and balanced wheel points are available for all makes of hand grinding tools. Write for literature.

Dremel Moto-Tools are time tested—have been widely used in industry for over fifteen years. A veteran of World War II, Moto-Tool served in war plants and at military maintenance bases throughout the world. Thousands of these mighty midgets helped to make the atomic bomb—were used to establish production records in defense industries during the last war. Hundreds of toolroom and production line operations, such as polishing and grinding dies, burring parts, marking tools, sharpening cutters, touch up jobs, etc. are accomplished in seconds, *without tearing down "set-ups."* Moto-Tool is sturdily constructed for long lasting industrial service. Weighs only 13 oz.—dynamically balanced for vibrationless operation.



DREMEL MFG. CO. Dept. 221-D RACINE, WIS. U.S.A.

REMARKABLE STABILITY

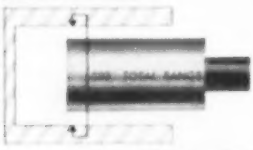
.003" RANGE



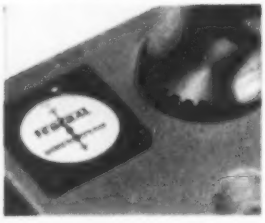
ACTUAL SIZE
9" x 7½" x 8½"
WEIGHT 17¼ LBS.

New FEDERAL Air Gage!
The DIMENSIONAIR!
Use it under oil or coolants!

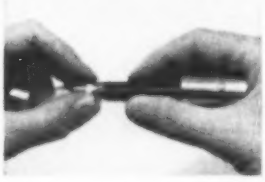
OUTSTANDING PERFORMANCE describes what this new air gage can do — and that's no exaggeration!



Exceptional measuring range • Greater plug clearance • Jets can be at any position • Longer plug wear.



Outstanding accuracy • Quick, positive setting • No drift • No sticking.



Finger-tight connections for plug and hose. Non-corrosive vinylite hose.

EXCEPTIONAL MEASURING RANGE .003"—You can determine the size of a hole long before it reaches the size required — no longer any oversize holes. The greater range makes it possible to gage semi-finished and finished holes with the same gage.

STABILITY IS UNEQUALLED — no drift of the indicator hand, hours — days — or weeks after. The jeweled meter is cushioned at both ends to eliminate damage. No sticking.

POSITIVE INDICATOR SETTING in a few seconds — simplest of all to set up. No master jet adjustment. Ask the man who usually sets your air gages to set this one and hear what he says.

IT READS .00005" *directly*. Not a "go — no go" gage. Only *one* master required. Tolerances are set up on the dial directly just as on a Dial Indicator. Insert plug in hole with jets at *any position* — it makes no difference.

ANY PRESSURE FROM 40 to 100 POUNDS. Normal pressure fluctuations do not affect its accuracy. Smallest centralizing error of any air gage — so small other gages not even sensitive to it.

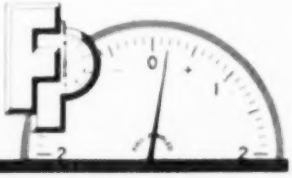
USE IT UNDER OIL OR COOLANTS. Greater jet pressure, larger orifices and *extra clearance* enable the plug to be used at production. Grit, dirt, and rough handling won't interfere or clog it.

DEEPER RECESS CLEARANCE — chrome plated plugs — longer wear, finger-tight hose and plug connections, non-corrosive, vinylite plastic hose, and many other outstanding performance features make this Federal Dimensionair an air gage which will not only amaze you but will pay off in better, more positive gaging.

Those who already use it say it's way ahead. Write for a free demonstration. You owe it to yourself to see the Dimensionair. FEDERAL PRODUCTS CORPORATION, 1144 Eddy Street, Providence 1, Rhode Island.

FEDERAL

Largest manufacturer devoted exclusively to designing and manufacturing all types of DIMENSIONAL INDICATING GAGES





Ball Bearings preloaded with Vulcan special fixtures

new Vulcanaire spindles

FOR ALL HIGH SPEED, HIGH PRECISION GRINDING — INFINITE SPEEDS CONTROLLED FROM 30,000 TO 65,000 R. P. M.

By controlling speed at ANY point you ELIMINATE need for a variety of types and kinds of constant speed spindles.

NOW IN USE ON

MILLS—ALL TYPES
GRINDERS
WOOD ROUTING MACHINES
GEAR SHAPERS
LATHES
RADIAL DRILLS
PANTOGRAPH MACHINES
SPECIAL MACHINES

USE THEM FOR

* finishing contours on hardened steel working surfaces
* burring or milling die castings
* routing wood contours
* carbide milling or finishing slots
* finishing holes in hardened steel to "tenths"
* grinding with diamond wheels, carbide burrs, or impregnated diamond mandrels.



For JIG GRINDING

ask for literature on Vulcanaire, Jig Grinder, the now famous 65,000 R.P.M. attachment for jig borers or mills. Be sure to mention machine tool application.

ADVANTAGES

- √ 10 micro inch finishes using carbide mills
- √ 6 micro inch finishes using mounted points
- √ Operates at any angle
- √ Air driven—air cooled
- √ Speed controlled at optimum point
- √ 3 5/16" long motor uses little working space
- √ Overheating and expansion prevented
- √ Easily adapted

For SPINDLE information ask for Vulcanaire Spindle literature and quote. Be sure to mention machine tool application and type of production.



VULCAN TOOL COMPANY 731 LORAIN ST. DAYTON, OHIO

Avey BMA-6 Tool Room Drill

Built in No. 2 and No. 3 Sizes

LARGE TABLE MACHINE having either Hand Feed, Power Feed, *Avey-Matic* or Reversing Motor and Control for Tapping.



This machine has proved to be very popular with Tool and Die Shop men, also production men. The large heavily ribbed table that is 34" x 25", plus ample chip trough, allows plenty of room for large dies or fixtures, plus additional space for tooling, etc. Each six spline precision ground spindle and drive sleeve is supported by five rows of precision ball bearings which give the precision needed today and in years to come.

The machine can be obtained with either of three speed ranges: low, medium, or high. Speed ranges are easily changeable for future jobs requiring higher or lower speeds, which is a necessity today with ever-changing design. Where power feed is desired four rates of feed are furnished.

Also manufacturers of

DEEP HOLE DRILLING MACHINES

DRILLING AND TAPPING UNITS

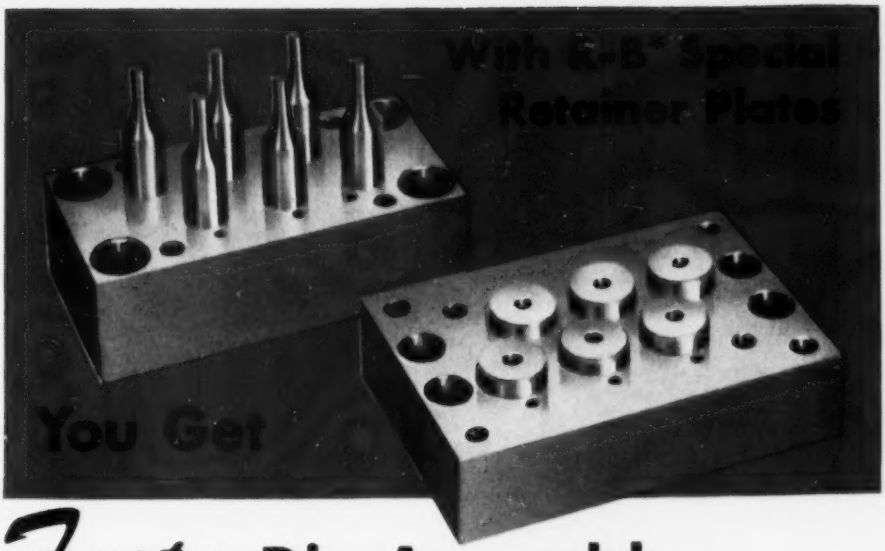
AUTOMATIC INDEX TABLES

SPECIAL DRILLING AND TAPPING MACHINES

●

THE AVEY DRILLING MACHINE CO.

CINCINNATI 1, OHIO



Faster Die Assembly... *Closer* Hole Spacing

Here's a way to gain all the advantages of R-B interchangeable punches and dies plus additional savings in time and money on die construction. R-B special retainer plates, made to your specifications, eliminate mounting individual retainers—ball retainer locks are built into the plate—thus are ideal for piercing parts with holes too close to permit separate retainers.

R-B special retainer plates are also particularly suited for progressive dies. They can be made in matched units for various punching stations, giving extreme accuracy. The punches or dies are interchangeable, enabling quick changes without time-consuming dis-assembly.

*Richard Brothers



Get the Whole Story IN THIS 48-PAGE FREE CATALOG

ALLIED PRODUCTS CORPORATION
RICHARD BROTHERS DIVISION

DEPT. 54 • 12625 BURT ROAD • DETROIT 23, MICHIGAN

Also Produced in Allied's Four Plants . . . HARDENED AND PRECISION GROUND PARTS • STANDARD CAP SCREWS • SPECIAL COLD FORGED PARTS SHEET METAL DIES • ALLITE DIES CAST OF ZINC ALLOY • JIGS • FIXTURES

For a new slant on finer, faster finishing

Investigate RUBBER-CUSHIONED Brightboy

BURR • FINISH • CLEAN • POLISH
in one time-saving operation!

Yes, something new has been added—RESILIENT RUBBER—to give you an entirely new conception of faster, finer light finishing—along with time savings that frequently amount to fifty per cent! In Brightboy's perfectly balanced compound, abrasive and *rubber* work simultaneously, swiftly, providing a unique action that's a revelation in surfacing and smoothing.

Investigate the almost limitless applications of versatile Brightboy, as countless businesses including prominent defense industries, have done and are doing. Get a small, inexpensive Brightboy wheel or block from your dealer, together with the Brightboy Catalog-Manual. Write us on any problem where methods or production are involved.

IN AVIATION—
Brightboy is used for finishing countless parts and assemblies for engines and airframes. Pictured is a Brightboy-finished rotor blade for jet engines.



HOW BRIGHTBOY SAVES PRODUCTION TIME

1. Bridges the gap between the rough grind and the buff.
2. Works to close tolerances; can be shaped to contour.
3. Produces a wide variety of conventional and special finishes and patterns; frequently the final polish.
4. Requires no before-use preparation or dressing; no skilled labor to handle it.

SOME BRIGHTBOY USES
Removing light digs, tool and heat marks.
Cleaning welded and soldered joints.
Finishing dies and molds.
Burring stampings, castings, machined parts.



WHEELS, STICKS, RODS, BLOCKS *for Machine and Manual Operations*

FOR FINISHING ALL METALS, WOOD, GLASS, PLASTICS, PRODUCTS AND PARTS

BRIGHTBOY INDUSTRIAL DIVISION
WELDON ROBERTS RUBBER CO.,
6th Ave. & No. 13th St., Newark 7, N. J.
America's Pioneer Manufacturers of Rubber-Bonded Abrasives

WELDON ROBERTS
Brightboy



NATCO MARKS A HALF CENTURY OF CONTRIBUTION TO INDUSTRIAL ADVANCEMENT

If you could look on the inside of thousands of manufacturing plants throughout the world, you would see NATCO machines busy drilling, facing, boring and tapping billions of large and small holes in parts destined for everything from automobiles, trucks and tramp steamers to radios, electric motors and home appliances.

All these things are a part of tremendous scientific industrial advancement made possible through the combined effort of machine tool builders and American Industry. With the turn of the half century into the atomic age of the present, every man and woman in the NATCO organization is proud of his part in this fifty-year record and glad to look ahead to the opportunity of serving industry and the forces of freedom in the years to come.

NATIONAL AUTOMATIC TOOL COMPANY, INC., Richmond, Ind., U. S. A.

Golden Anniversary

1901 NATCO 1951

NEW SMALL HONING MACHINE by FULMER



New Fulmer
Model 415
Hydraulic
Honing Machine

Major Specifications

Honing Capacity—¼" to over 4"
Stroke—15" maximum
Reciprocating speeds—1 to 70 fpm.
Spindle Speeds—3
Spindle Drive Motor—3 HP
Hydraulic Pump Motor—2 HP
Hydraulic Oil Capacity—25 gal.
Coolant Capacity—45 gal.
Spindle Diameter—1¼"
Vickers Hydraulic System

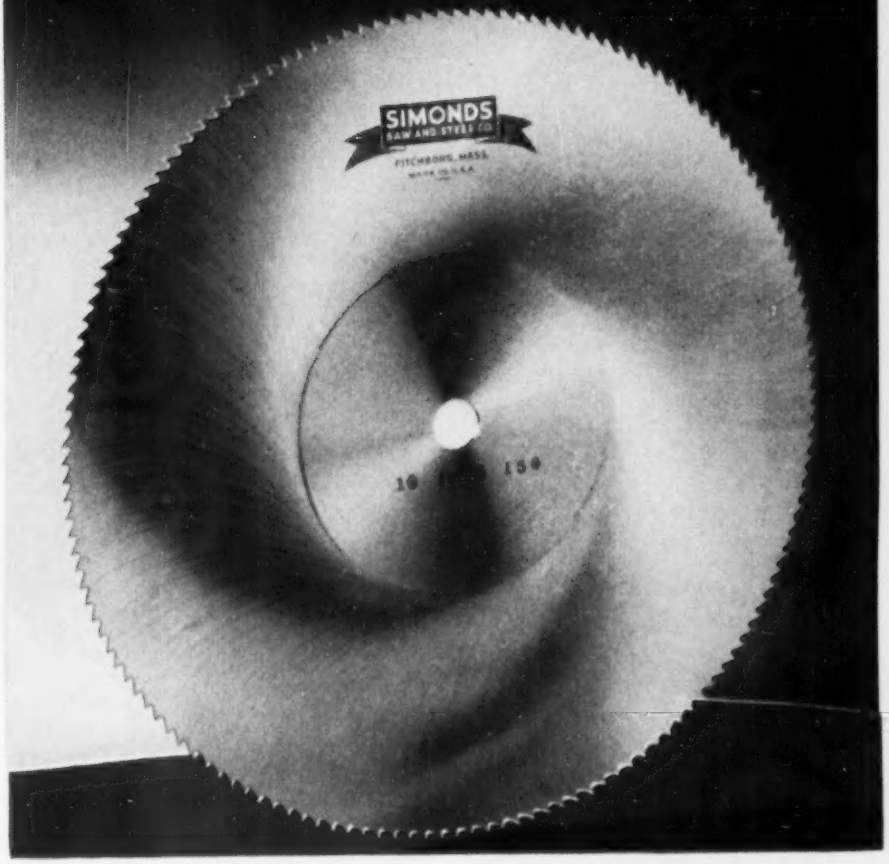
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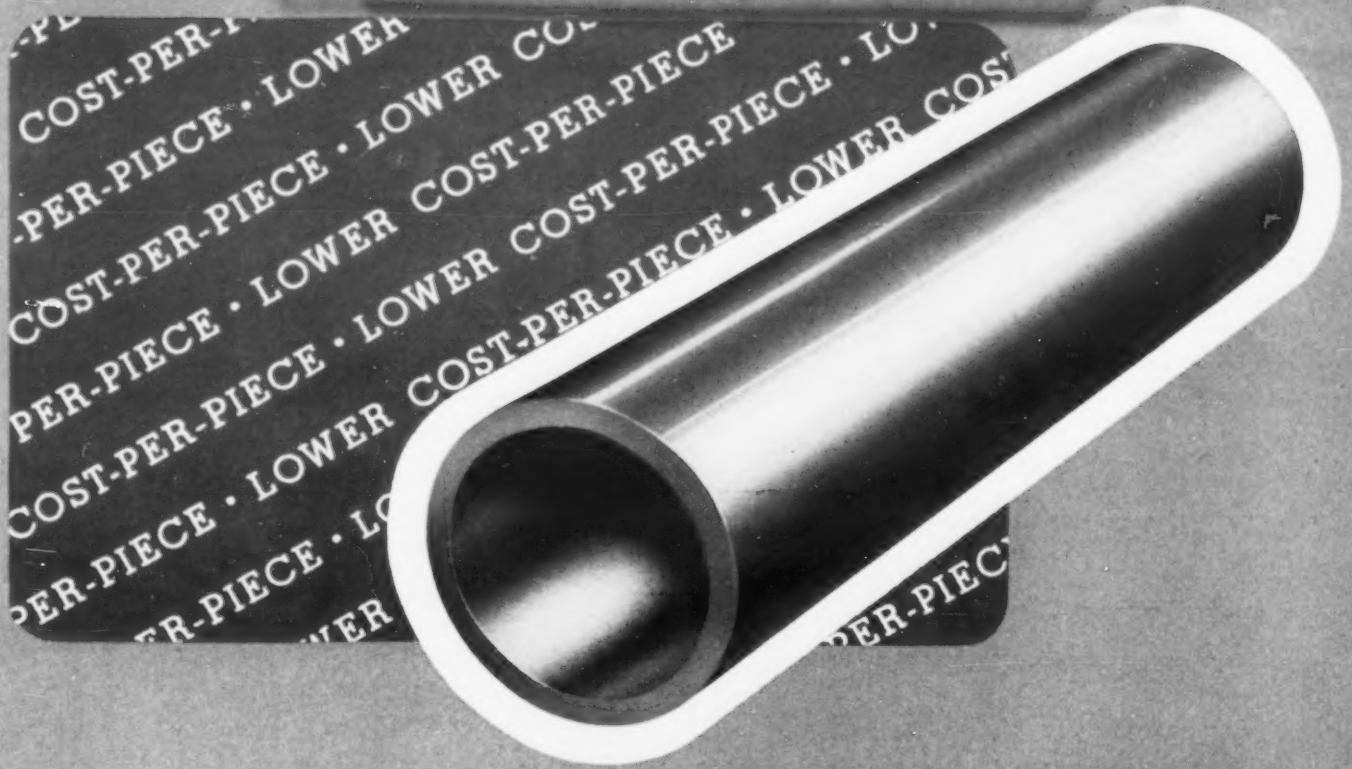
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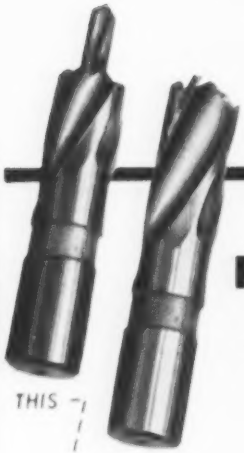
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MODERN Machine Shop

APRIL, 1951 Vol. 23, No. 11

FEATURES IN THIS ISSUE

Continental Plant Is Well Equipped — ***By D. C. Herricks***

The building of ginning machinery no longer requires the use of all the manufacturing facilities provided at the Continental plant. This story tells how some of the equipment in the plant is being used to help meet the needs of other manufacturers. Page 94.

Straightening Methods and Equipment, Part II — ***By John E. Hyler***

In this article Mr. Hyler describes the use of open-frame presses, horizontal-ram straightening units, flexible-power presses, and an unusual straightening unit which is provided with a hook-pulling mechanism. Page 108.

Sequential Sampling Simplifies Receiving Inspection — ***By Gilbert C. Close***

The author describes the method of selecting a few parts from each shipment received and basing the quality of the entire lot on the quality of samples selected at random. Page 132.

Progressive Dies and Their Machines — ***By C. W. Hinman***

Several interesting designs of progressive dies are discussed as well as the application of high speed dieing machines and an automatic feeding unit. Page 156.

Conference Advocates "Stitch in Time" Maintenance Programs — ***By H. H. Slawson***

Mr. Slawson reviews the most pertinent suggestions offered by some of the country's leading engineers who took part in the recent Plant Maintenance Conference held in Cleveland. Page 170.

Isotopes at Work — ***By Frank Charity***

The author tells how radioisotopes are being used as "tracers" in the analyses of various alloys, as integral elements in measuring instruments which are said to detect dimensional variations of as little as one micron, and in many other industrial applications. Page 196.

Highlights of Papers Presented at ASTE Know-How Session

Extracts of some of the more important papers which were presented at the American Society for Tool Engineers meeting which was held at the Hotel New Yorker on March 14 through 16. Page 214.

Shaping of Metals Forum

The program of the Cincinnati, Columbus and Dayton Chapters of American Society for Metals Tri-Chapter Meeting which will be held in Cincinnati on April 12. Page 240.



Fig. 1—Honing the bore in a Diesel engine cylinder, using a Fulmer Vertical Honing Machine equipped with a Micromatic Hone.

Continental Plant Is Well Equipped

By D. C. Herricks

Supervisor, Quality Control Department
Continental Gin Company, Birmingham, Ala.

Manufacturing facilities are provided for building ginning equipment and handling work of other manufacturers on contract.

THE story of Eli Whitney and his invention of the cotton gin is one that is known to every American Schoolboy, but the gin that Whitney devised and the gin of today resemble each other only in principle. Whitney's gin consisted of a series of sharp-toothed circular saws mounted on a shaft so that the saws could revolve in slots in a comb-like cast iron grid. The grid held the cotton balls while the saw-teeth picked off the cotton fibers; the slots were too narrow to permit the seeds to pass through. A brush, revolving against the saw-teeth, picked off the fibers.

The cotton gin of today isn't that simple. The mechanism of the modern cotton gin includes (1) devices to convey the raw cotton from the wagons to the machine, (2) mechanical units to regulate the rate of cotton feed to

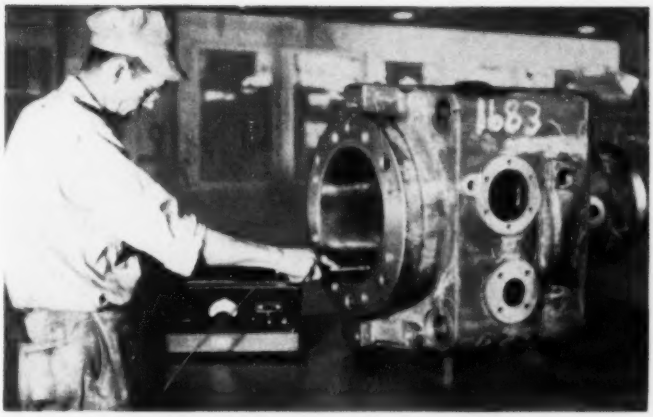


Fig. 2—Using a Profilometer to gage the surface irregularities in the cylinder bore. Maximum allowable surface irregularity is 45 microinches.

the ginning saws, (3) additional equipment for cleaning the cotton, (4) conveying equipment to carry the fibers to the baling press, and (5) conveyors that carry the seeds away as they fall from the gin. These are the essential features; actually, the gin performs many minor tasks also.

Prominent among American cotton gin manufacturers is Continental Gin Company of Birmingham, Alabama. The excellence of Continental machinery is attested by the fact that Continental gins are to be found in every cotton-producing country in the world. Continental has improved the mechanism and quality of its product at every opportunity, and in fact has to a large extent "worked itself out of a job" in doing so. As the speed and capacity of the gin were improved, the need for additional gins lessened and whereas in 1908 there were some 30,000 cotton gin plants in use, today there are fewer than 8,000. The individual gins are handling much more cotton.

To keep its large plant busy, the management of Continental Gin made its facilities available to other manufacturers on contract, and has been so successful in this field that it has been forced to add to its already diversified equipment. Being successful in acquiring a license to produce high-strength Meehanite castings, new foundry equipment was set up and Continental

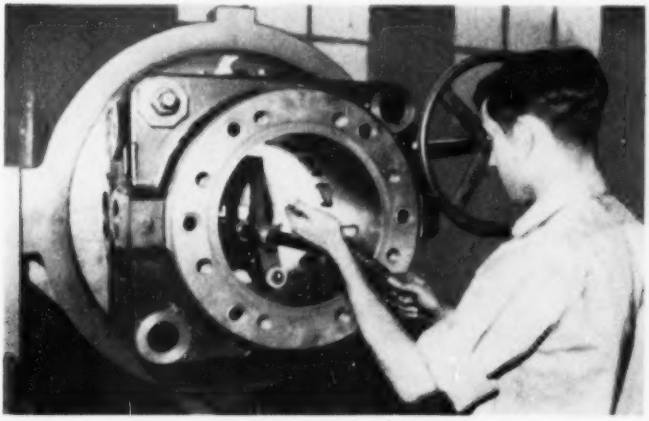


Fig. 3 — Using a "home-made" grinding tool to grind the relief in cylinder ports.

has been operating to capacity in that division ever since.

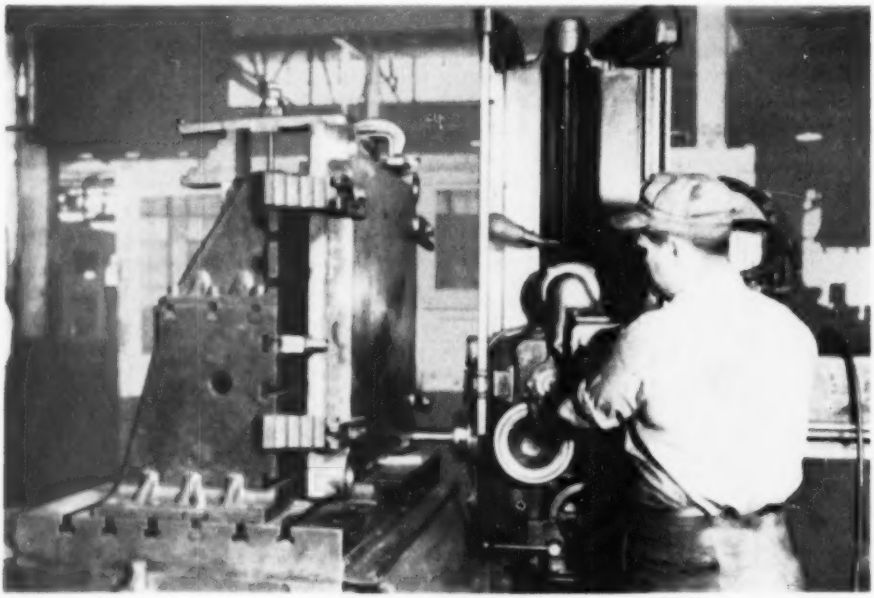
Typical of the job-foundry projects is a gas-diesel cylinder casting which eventually becomes a part of an 11-cylinder gas-diesel engine. After casting, the cylinder is moved to the machine shop where it is bored to within 0.010 to 0.012 inch of finish size and then finished by honing.

The honing operation, performed in a "Fulmer" vertical honing machine equipped with a hone of 14 inches diameter, finishes the bore to within 0.002 inch limit of finish size and to a maximum surface variation of 35 to 45 microinches. The operation is shown in Fig. 1. Inasmuch as a constant flow of coolant is maintained to assist the honing operation, a sheet steel basin-shaped guard is necessary, as shown, to keep the coolant from splashing.

After the honing operation has been completed, the bore is gaged with an inside micrometer to make sure that it is within the specified limits for diameter, and with a Profilometer to ensure that the surface is within the limits allowed. Figure 2 shows the inspection of the surface.

Considering that the Profilometer measures surface irregularities in millionths of an inch, the principle upon which the instrument operates is very simple. Mounted on the end of the handle held in the operator's hand is a small carriage carrying a tracer point, consisting of a sharp diamond, that is held in contact with the work-surface by delicate spring tension. The springs are so arranged that the point is free to move in a direction perpendicular to the surface but is restrained against other movement.

Fig. 4—Boring guide pin holes in a die-base. The Jigmil can be depended on for accuracy to 0.0001 inch in the spacing between the holes in the die.



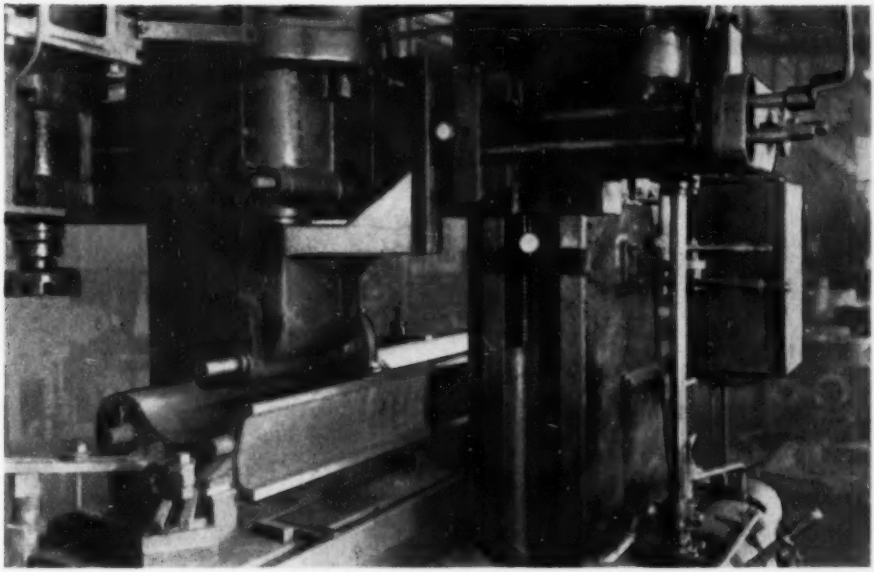


Fig. 5—Milling the bed in a steam chest for a power laundry ironer. The machine is an Ingersoll mill, equipped with a special driving head in which the cutter-spindle is located at right angles to the table-feed.

Mounted integral with the tracer support is a tiny coil that is located in the field of a permanent magnet. Movements of the tracer are thus translated into electrical voltages in the coil which are proportional to the velocity of movement. These voltages are amplified and are caused to produce displacements of the spot of a cathode-ray oscillograph. These displacements can be made proportional to the displacements of the tracer point, providing vertical magnification by which the height of surface irregularities can be measured.

The operator shown in Fig. 3 is grinding the relief in the ports of a Diesel engine cylinder, using a home made grinding tool equipped with a 2-inch wheel. The tool is of simple design, consisting of a shaft upon which is mounted the arm carrying the grinding wheel, the shaft being mounted in a spider that can be bolted to the rear end of the cylinder. Using the cross-handle on the front end of the shaft, the shaft is revolved with a reciprocating motion until the relief has been ground. The spider is so designed that the axis of the shaft is below the axis of the cylinder bore; thus the relief "tapers out" at each side of the port.

One of the more interesting machines in the Continental shop is the DeVlieg "Jigmil" shown in operation in Fig. 4. The operation in process is that of boring the guide-pin holes in a die-base, which is a comparatively simple operation, but the machine is also applied to the boring of bushing holes in the die—and this is often a high-precision job.

The spacing between the holes in a die can be controlled to an accuracy of

0.0001 inch through the operation of a single push button and, by using the Jigmil index table, four sides of a workpiece can be machined without rechucking. In the Continental shop the Jigmil has been found invaluable, not only for tool work, but for machining lots consisting of only a few pieces

right angles to the table-feed. A preliminary roughing operation is performed in a planer, which leaves approximately $\frac{1}{8}$ inch of stock to be removed in the milling operation. Using an Ingersoll cutter with six high speed steel blades, of a diameter that approximates the radius required in the steam

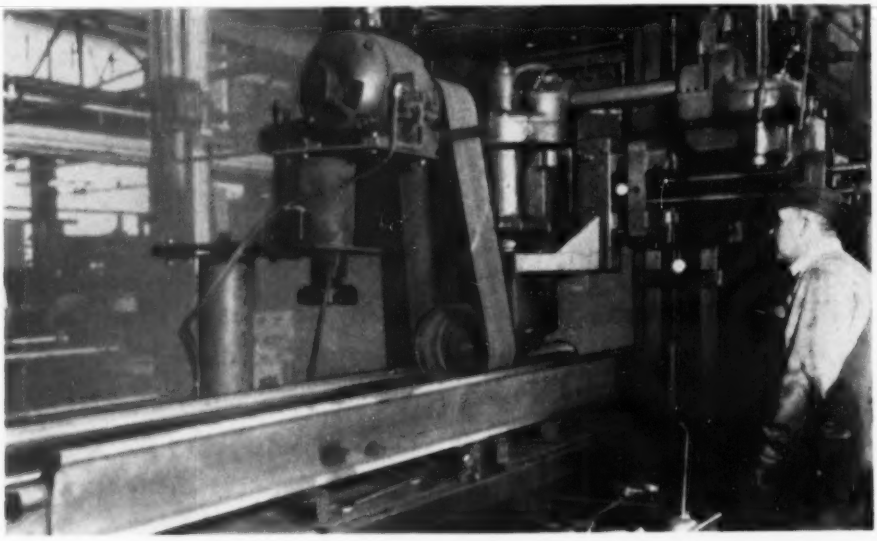


Fig. 6—The ironer bed is finished by grinding with an abrasive belt, using the Ingersoll mill and a special grinding attachment.

where extreme accuracy is a requirement.

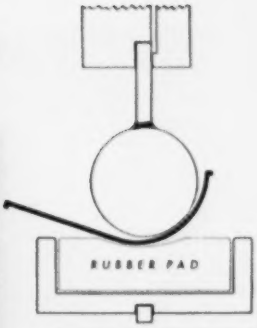
The illustrations Figs. 5 and 6 show two of the operations involved in the machining of steam chests for power laundry ironers. The machine is an Ingersoll milling machine, and although the machine has seen many years of service, it still does an excellent job with the proper tooling.

Figure 5 shows the operation of milling the bed in the steam chest. Here an attachment is used that permits the use of a cutter on a horizontal spindle, mounted so that the cutter operates at

chest bed, the operation proceeds while the work is fed past the cutter.

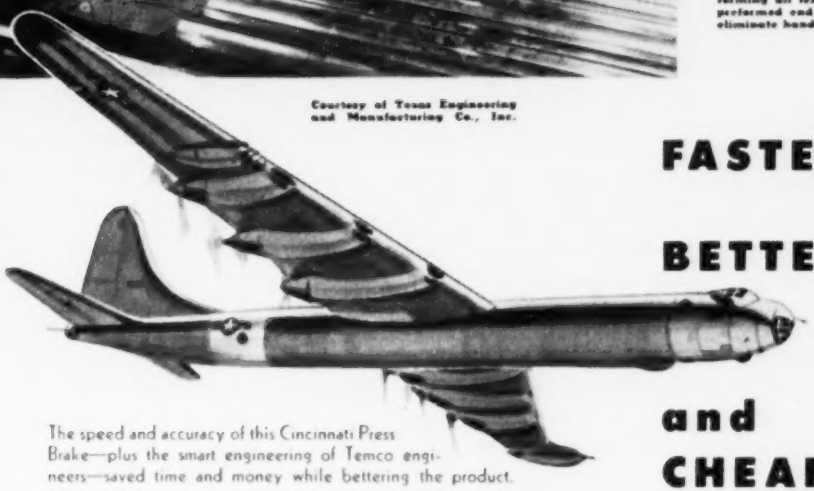
To perform the finishing operation on the bed of the steam chest, the milling cutter is removed, the spindle driving mechanism is disconnected, an 8-inch wide pulley is mounted on the spindle, and a 30-h.p. motor equipped with a pulley of corresponding width is mounted on the crossrail of the machine as shown in Fig. 6. An 8-inch abrasive belt is mounted on the pulleys to perform the grinding operation. This equipment does a highly satisfactory job. When finished, the ironer bed





Slots cut in the rubber pad permit forming all length of ducts with preformed end seam flanges and eliminate hand forming.

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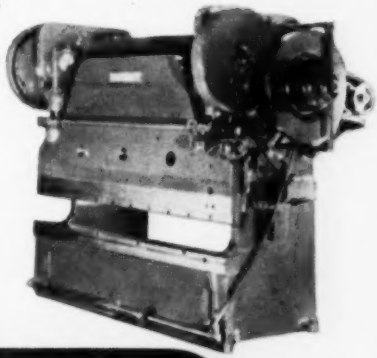
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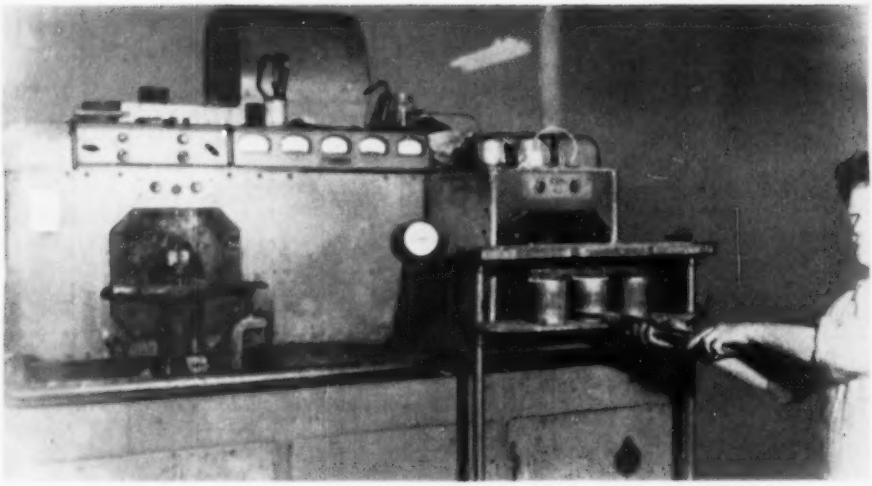


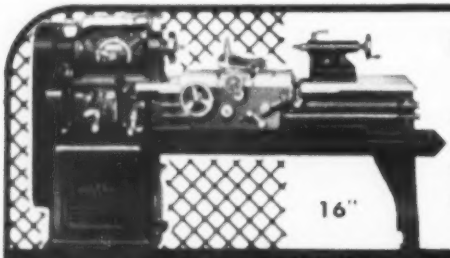
Fig. 7—Brazing end plates in rollers for a belt conveyor, using a Tocco 75 kw. Induction Heating Machine.

is subjected to a test in which it must withstand 100 pounds steam pressure and 200 pounds hydraulic pressure.

The versatility of Continental Gin's equipment is indicated by the illustration Fig. 7. The workpiece is a roller for a belt conveyor, and is made of steel tubing cut to the specified length, with a Meehanite end plate brazed in each end.

The illustration shows the brazing operation. Processing three workpieces at a time, the end plates are placed in position, a ring of bronze wire is dropped into place at the junction of the plate with the tubing, and the pieces are set in position, as shown, in a Tocco 75 kw. Induction Heating Machine. In 42 seconds the bronze has melted and filled the joint, and the pieces are removed and replaced by new workpieces.

An important item in the mechanism of the Continental Gin Company's product is a helicoid screw conveyor. The screw is made by forming flat strip cold rolled steel strip to the desired lead and diameter of spiral, then weld-



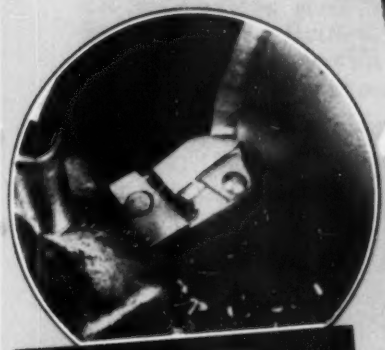
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ing the spiral to a shaft of steel tubing. The machine in which the spiral is formed, shown in Fig. 8, was designed by Continental engineers and built in the Continental plant.

The machine consists primarily of two hardened steel bevel rollers, mounted on heavy spindles which are so positioned that the faces of the rollers make perfect contact, as shown in the illustration. The roll spindles can be adjusted to provide for any thickness of metal up to ⅜ inch thick, to form a spiral in any diameter up to 18 inches, and for any amount of spiral lead.

The screw shown in process in the illustration is formed from a strip of flat cold rolled steel 0.120 inch thick and 5 inches wide. The diameter of the finished spiral is 16 inches. As the spiral leaves the machine it is cut to length, and the sections are afterward welded to the tube which forms the shaft. The cutting operation is performed with a hydraulic shear, also designed by Continental engineers and built in this plant. The illustration shows the shear in position for cutting.

In addition to the Birmingham plant, the Continental Gin Company also has plants at Prattville, Alabama, and Dallas, Texas. The Birmingham plant covers 10 acres and employs something over 1,000 people, many of whom are father-and-son teams. Although Continental's molders, machinists, and structural workers are organized in national unions, no strikes have occurred since 1938. Continental is doing a good job as an exponent of the fast-growing Industrial South.

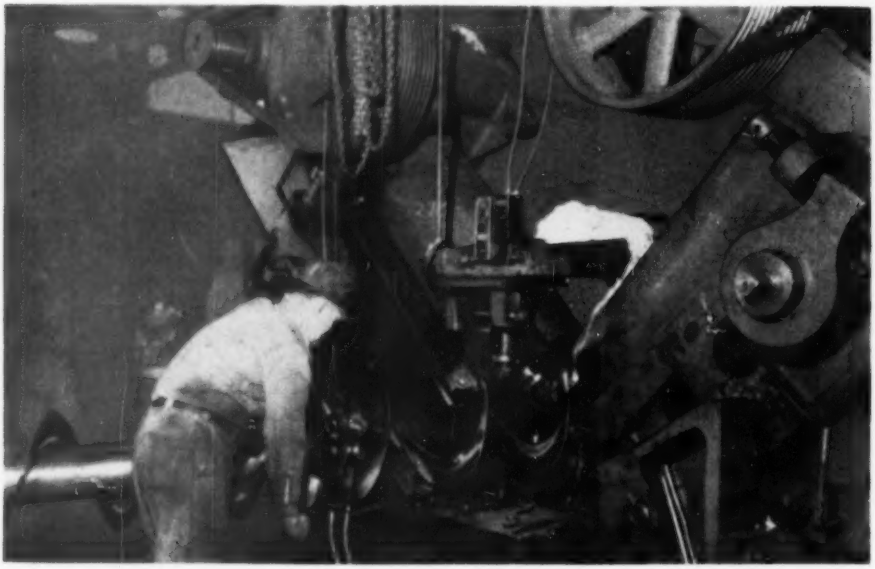
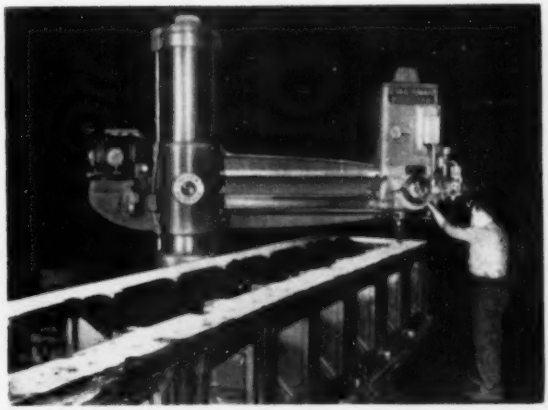
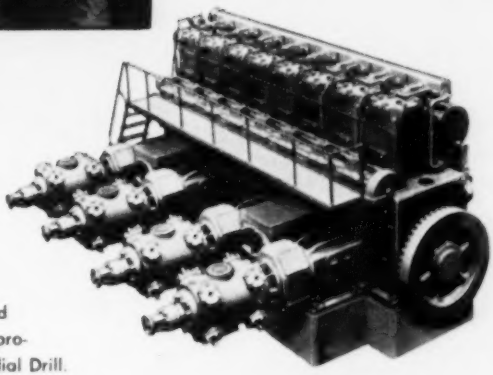


Fig. 8—Spirals for helicoid screw conveyors are formed in this hydraulic forming machine. The machine was designed by Continental engineers and built in the Continental plant.

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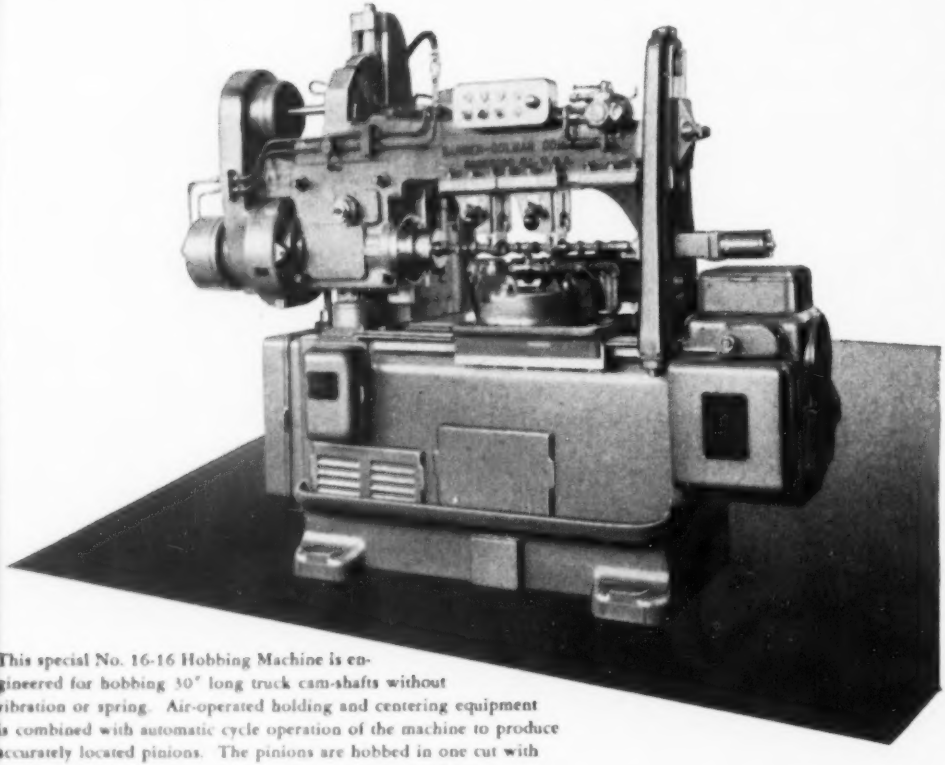
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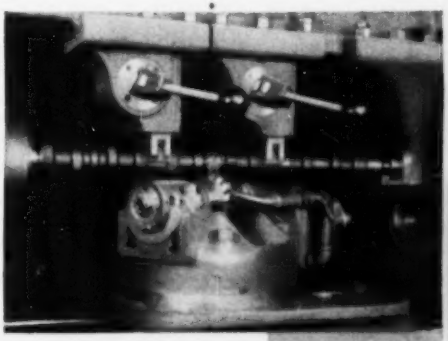
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HOBS AND MACHINES SINCE 1911

STRAIGHTENING METHODS AND EQUIPMENT

Part II

A discussion of the application of open frame and flexible power type presses, horizontal ram units, and a method of straightening which employs a hook-pulling mechanism.

By John E. Hyler

MANY relatively light parts become distorted to some degree if they are subjected to a heat treating operation, and must be straightened subsequently. The distortion is particularly liable to occur where some type of machining is performed which causes uneven stresses to develop during heat treating and quenching. Thus, shaft forgings machined with keyways often distort at the keyway location. There are some presses used for straightening such work which are equipped with means for limiting the maximum amount of pressure they will deliver for a given straightening job in process, even though their maximum rated capacity may be ever so much higher. This is often found a convenient provision.

However, many types of light work are straightened, both before and after tempering, where a highly elaborate or powerful machine is not required. Camshafts, crankshafts and various other parts are straightened in many places with nothing more elaborate than husky bench-type

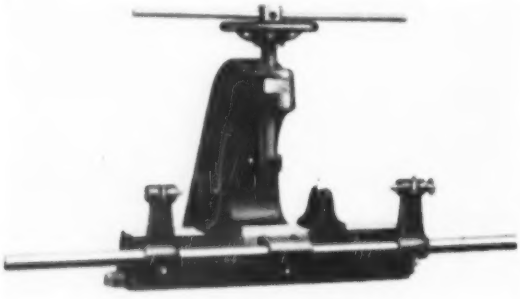


Fig. 1—A bench-type straightening press having capacity to straighten material up to 3½ in. diameter. Other presses of this same design are available in capacities of 1¾ and 2½ inch. Illustration courtesy Springfield Machine Tool Company.

presses having a hand-operated, threaded screw for applying the pressure, a cast-steel, case hardened pressure block being used at the end of the screw. Even in plants where they are not ordinarily used on production, bench straightening presses of this kind are highly useful as standby equipment.

Hydraulic arbor presses of certain designs can often be used for straightening long work, though they might not at first seem adapted for such duty. Some of these presses are made in such manner as to incorporate vertical openings in their end frames, which allow long work to be passed through them. They can be and sometimes are equipped with auxiliary roller stands, set on the shop floor in selected positions at both ends of the press. Twin rollers are held in special yokes and are made sensitively adjustable for height at the top of each of these roll stands, so they can be brought into precise alignment regardless of the fact that the floor may not be level. Further, some of these presses which have been especially fitted for straightening duty on long shafts (as for instance P. T. boat shafts 24 feet in length) have been provided with a special micrometer-dial attachment. A perfectly straight, flat, ground bar is mounted across the back press frame. The dial indicator, by means of a special fitting, is carried on this bar in such manner that it can be positioned anywhere along the length of

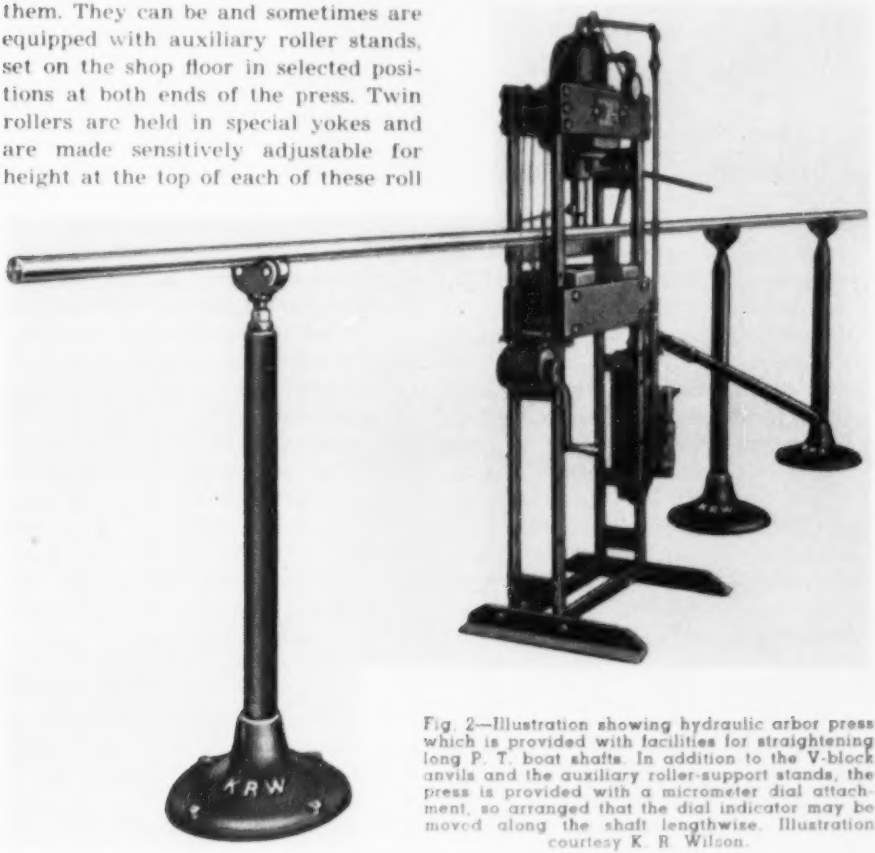


Fig. 2—Illustration showing hydraulic arbor press which is provided with facilities for straightening long P. T. boat shafts. In addition to the V-block anvils and the auxiliary roller-support stands, the press is provided with a micrometer dial attachment, so arranged that the dial indicator may be moved along the shaft lengthwise. Illustration courtesy K. R. Wilson.

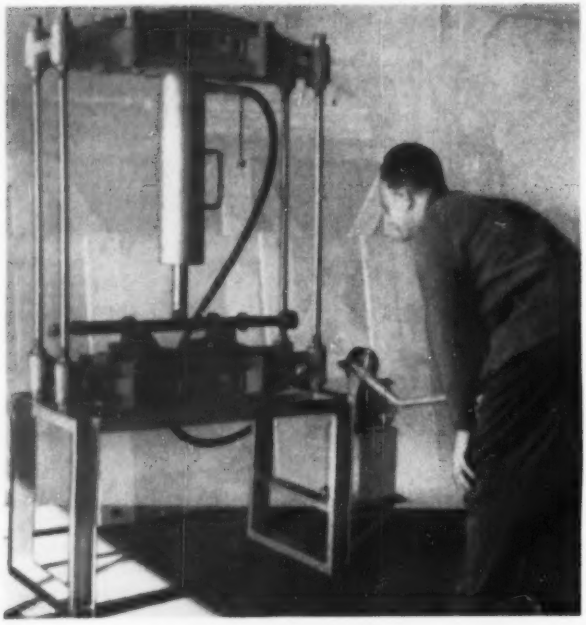


Fig. 3—A 100-ton shop press mounted on a shop stand and powered with a hydraulic hand pump for straightening duty. The hydraulic cylinder is a spring-return type having 13 inches of ram travel. Illustration courtesy Rodgers Hydraulic, Incorporated.

the work, as need may require. V-blocks are incorporated as bearing points for shafts being straightened in this type of setup.

It may readily be seen that while gap-type presses are highly favored for many straightening operations, such work is by no means limited to the gap-frame press. There are various presses in which long work is passed through an open press framing for straightening. Hand-operated hydraulic presses of open type with strain-rod framing are quite often employed for straightening shafts and like members before machining, some of these presses being fitted with spring-return cylinders. Pipe straighteners of hand-operated hydraulic type, which are themselves comparatively light in weight, and easily moved from one location to another, will straighten pipe up to 10 in. O. D. These straighteners often permit salvaging pipe and other materials that would otherwise be lost, especially around job shops.

Various hydraulic presses used for straightening are made with a stationary press bed, and with the hydraulic pressure cylinder and press head supported at the top of two heavy strain rods. On many such presses, the complete pressure-unit assembly is traversable along the press bed by means of a handwheel and a resultant rack and pinion action. The traverse action takes place by means of two wheels on each side of the press rolling along a flange or runway provided for the purpose. One very fine press of this general type substitutes structural-steel framing for the strain rods often found on other straightening presses. This is a highly competent shaft-straightening unit which holds the workpieces between spring-mounted centers, making it unnecessary to remove the work from between the centers while pressure is being applied. As soon as ram pressure is released, the spring mountings of the centers react and lift the workpiece above the anvils, allowing it to be checked.

Another very remarkable aspect of

this particular straightening machine is the fact that an adjustable indicator is provided which mounts directly under the workpiece. This is unique in that such an indicator not only tells the operator where the runout in the shaft is located, and tells him the extent of the runout, but also actually tells him how much he is deflecting the shaft by the pressure he is applying. After the ram is released, it tells him how much the shaft has been bent. The press can naturally be tooled in different ways for accommodating different types of straightening work.

Horizontal-Ram Straightening Units

Since the straightening operation is actually a carefully-controlled bending operation, which "bends out the bends", there is an occasional machine considerably used for bending duty which may alternately be used for straightening as need may appear. This is the case with certain single-ram presses of table type, having a horizontally-acting ram. Such units often have their heavy-thickness tables or beds drilled with a considerable number of holes in judicious locations, so that special, heavy, shouldered pins may be set into selected holes to provide bearing points for workpieces, allowing those bearing points to be set closer together or farther apart. With the hydraulically-operated horizontal ram engaging the workpiece and applying pressure to it midway between the selected bearing points, and with the sensitive control one has at his command over pressure being applied, it is generally possible to straighten a piece of material quite accurately.

There are, however, heavy-duty hydraulic presses of horizontal-ram type which are not at all indicated for bending operations, but which are designed purely for straightening such items as heavy shafting, axles, and all



Fig. 4—A 150-ton press made with shorter-than-average-length strain rods, set up for straightening shafts before machining and threading their ends. The shafts have to be perfectly straight so the squirrel cages through which they are inserted will not vibrate when running at very high speed. Illustration courtesy U. S. Air Conditioning Corporation and Rodgers Hydraulic, Incorporated.

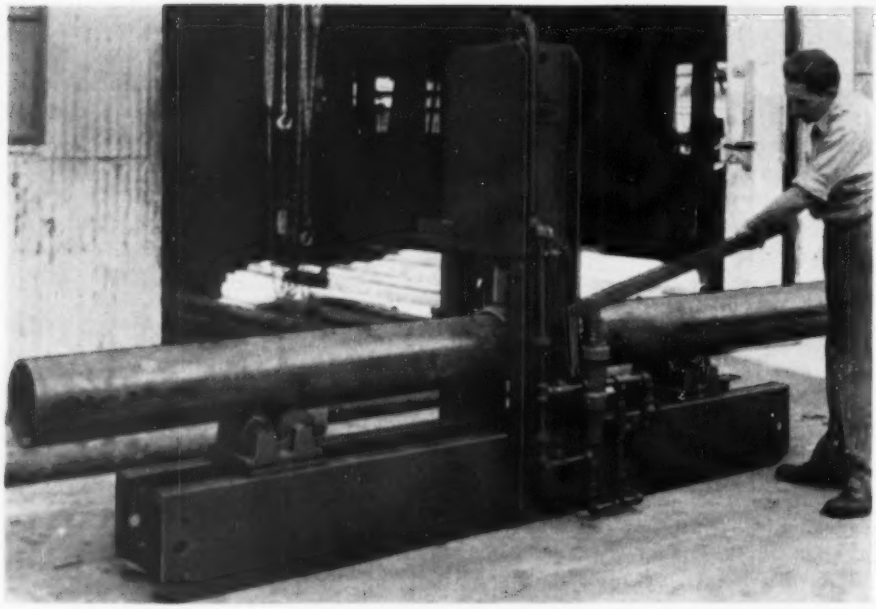


Fig. 5—The hydraulic pipe straightener shown here is made with a sturdy all-steel frame and a very simple but powerful hydraulic pump and ram which one man can operate with both ease and speed. The unit is readily movable from place to place, and allows the salvaging of much pipe and other material which the job shop would otherwise lose or abandon.
Illustration courtesy Alamo Iron Works.

kinds of round bars and rods. These presses provide a very definite handling advantage, for while the actual bending pressure is directed against two vertical and adjustable bending anvils or resistance dies having their bearing faces in a vertical plane, the heavy workpiece is supported on a series of horizontal-axis rolls, the axes of which rolls are parallel to the stroke of the ram. Deposited on these rollers, it is a very simple matter to move the workpiece endwise until the point of runout registers with the line of ram

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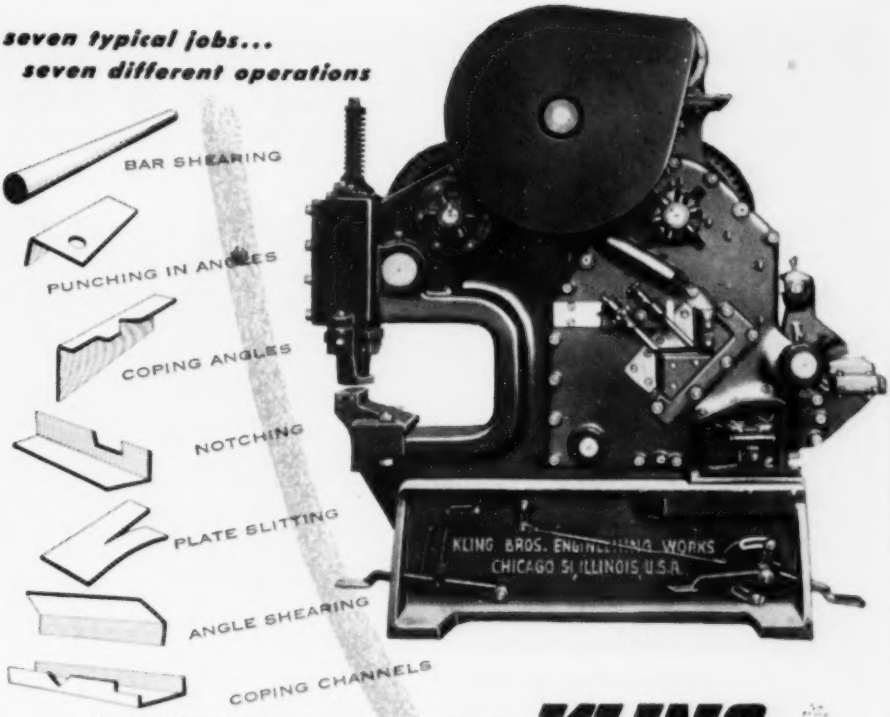
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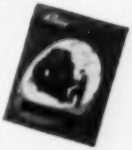


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advance. Situated in spaced relationship between these horizontal-axis rolls which support the workpiece are pairs of lifting rolls, such as are quite often found in different types of straightening machines.

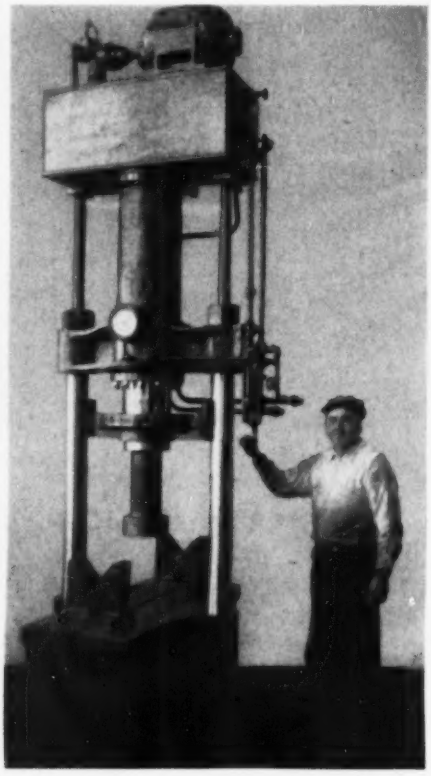


Fig. 6—A straightening press of hydraulic type, having the head and the base connected by two strain rods. Illustration courtesy Baldwin Locomotive Works.

These lifting rolls are actuated to lift or lower the work by means of either hydraulic or air-cylinder power, depending on the particular design of the machine. Thus, the work is lifted from one set of rolls and supported on another set, so it can be revolved on its

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Fig. 7—A straightening press of hydraulic type having its head and hydraulic ram supported above the bed on two strain rods. The press bed is stationary, but the pressure unit can be traversed along the bed to any desired position, up to 35 inches each side of the center point, by use of the handwheel shown. Illustration courtesy Baldwin Locomotive Works.

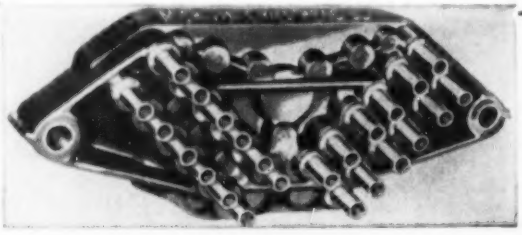
Notwithstanding the fact that many different types of hydraulic presses are employed for various kinds of straightening duty, they by no means fill the entire production-straightening picture. A highly-ingenious arrangement by means of which continual rotating movement of a vertical-axis ram on its axis is transformed into an endwise thrusting action of variable power has been designed into a so-called flexible-power press. This style of unit is widely used for straightening

axis in the approved manner for testing the work. Such presses often have a capacity of 200 tons, but an adjustable stop is provided to limit the straightening movement of the ram. Therefore the full tonnage of the press may be used without any danger of reverse-bending the work being straightened.

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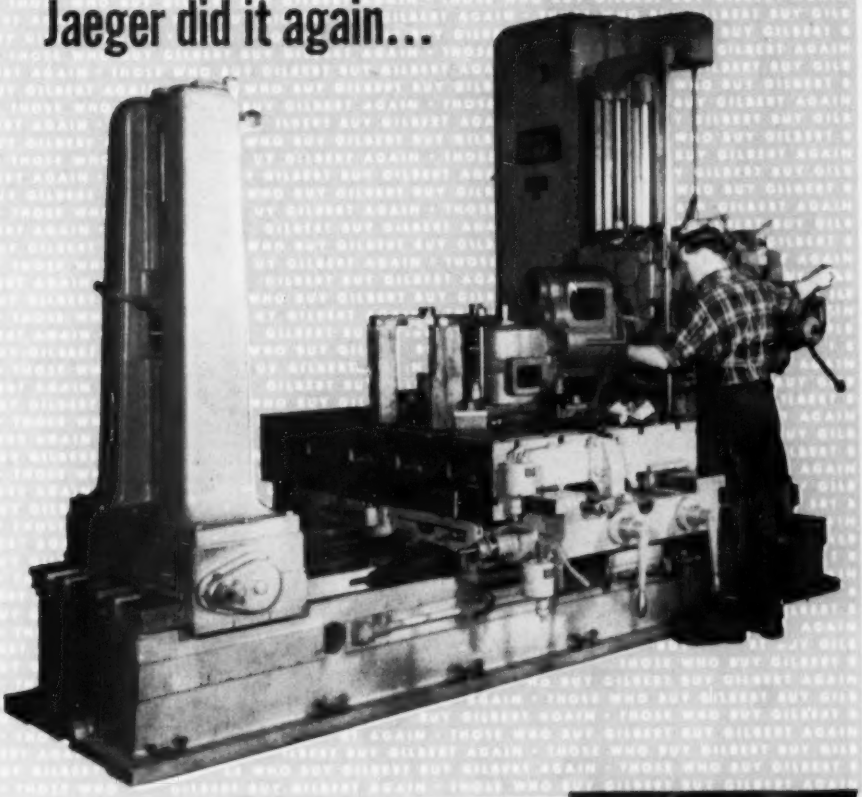
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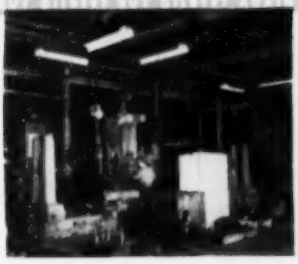
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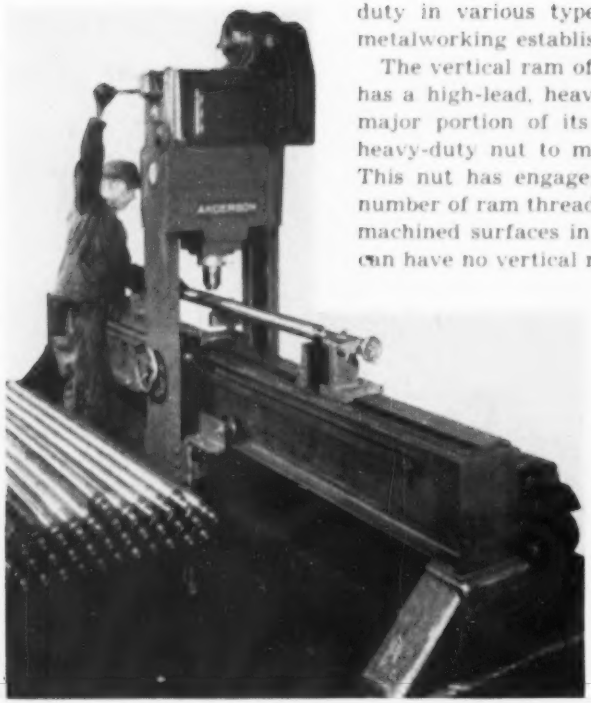


Fig. 8 —(Left) Hydraulic straightening press engaged in a roll-straightening operation. Located in the plant of the Miehle Printing Press Company in Chicago, it is used for straightening large printing rolls. Note the ram and head of this press are traversable along the bed by hand-wheel action, so that it can be used to straighten the shaft or roll at any longitudinal point of runout without any necessity for moving the roll itself. Illustration courtesy Anderson Brothers Mfg. Company.



Fig. 9 — The horizontal ram press shown here is equipped with heavy shouldered pins which can be lifted and placed in different holes in the table to accommodate the bending or straightening job being done. Note they are fitted with lifting eyes so they can be handled with a shop hoist from one hole to the other as need appears. While the press is here shown on bending work, it may be seen that it is readily adaptable for straightening work also. Illustration courtesy R. D. Wood Company.



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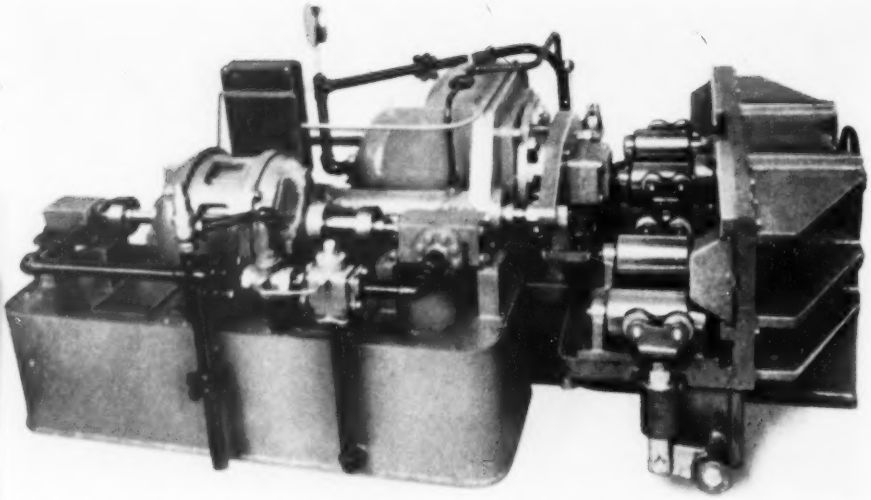
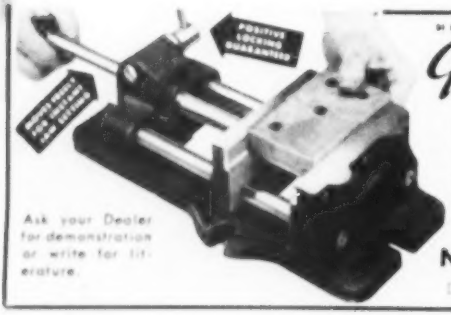


Fig. 10—Here is shown a horizontal-action hydraulic press designed for heavy-duty straightening on shafting, axles and all kinds of heavy round bars and rods. Note there is a series of horizontal-axis rollers on which the workpiece is rolled into the machine and on which it is supported, and that there are two anvils or resistance blocks to the right of these rolls, against which the workpiece is thrust by ram action. The anvils are adjustable, closer together or farther apart. Observe there are four sets of cradling rolls, which are normally below the horizontal-axis rolls. Illustration courtesy R. D. Wood Company.

large diameter, has an intermediate webbed portion between its "hub" and its periphery, and has a pulley-like periphery with a smooth surface adaptable for gripping with a brake band. Normally, when the machine is idling, the large friction nut simply revolves with the ram at the same speed as the ram. It is provided with a brake band, however, which is tightened on the nut periphery whenever the press operator treads on a pedal provided for the purpose.

When the operator treads on the pedal, the brake band tightens in proportion to the amount of pressure he puts on that pedal. This stops the friction nut from revolving, whereupon the still-revolving ram is forced to move downward by the high-lead

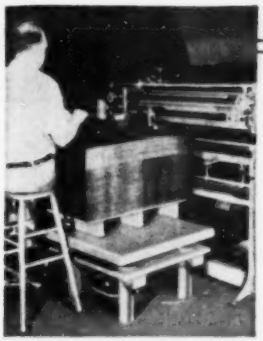


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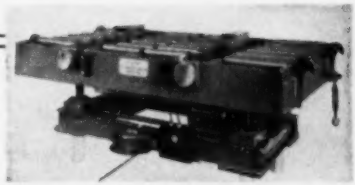
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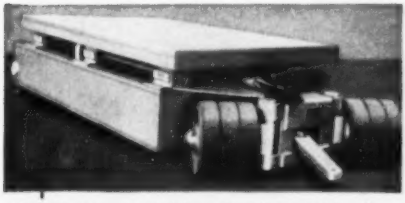
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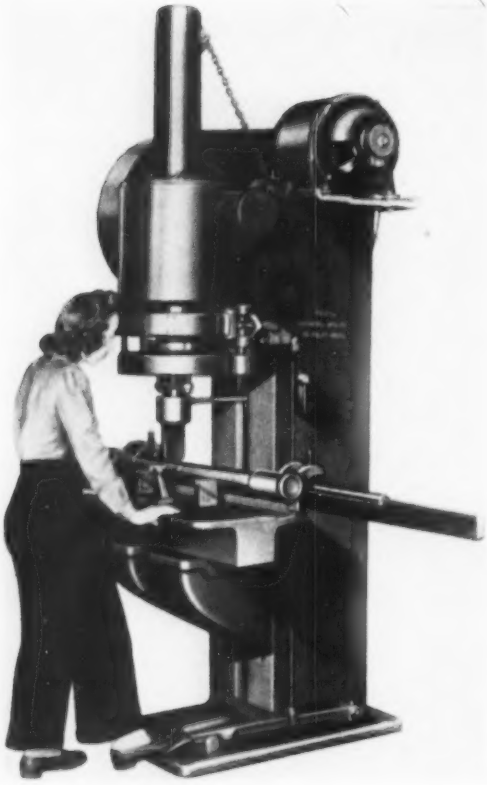


Fig. 11—This illustration shows a flexible power press tooled for straightening heavy centered work, and using what is known as a screw center type attachment. The centers in an attachment of this kind will engage work which varies more than ¼ in. in length. Illustration courtesy General Manufacturing Company.

thread, and to come into contact with the work. As it meets the resistance of the work, and pressure builds up, the friction nut tends to slip in the brake band, whereupon the operator must supply additional pedal pressure to obtain further downward ram action. Under these conditions, the operator is able to actually feel the amount of pressure being put on the work by the ram, and can work with a high degree of sensitivity once he is accustomed to the machine. The amount of downward-thrusting power provided by the ram is highly multiplied as against that exerted on the pedal, but it is always in proportion, at least in one sense. The press is so built that it would not be possible for an operator to use enough pedal pressure to damage the machine. The brake band will slip on the friction nut in every case before actual damage can occur.

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Fig. 12 — Illustration showing a flexible-power press tooled for straightening with an attachment of the lock-lever type, engaged in straightening axle shafts at the Chrysler Corporation Lynch Road plant. Illustration courtesy General Manufacturing Company.

concentric with it. Through this worm, wormwheel and certain spline keys, positive rotary movement is imparted to the ram. Different types of straightening attachments are provided for use on the tables of presses of this kind.

Straightening With Hook-Pulling Mechanism

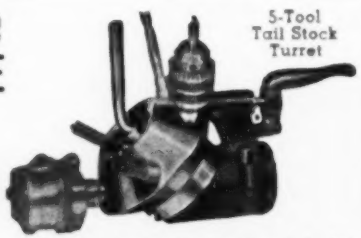
Before leaving the subject of straightening crankshafts and other automotive parts it must be observed that a highly ingenious machine quite new in principle has been put in use and is making a remarkable showing on such work. This particular machine is not versatile in the sense that various others are, but is engineered and built as required for straightening a specific standard part in large quantities. When so built and used, it generally shows a much higher rate of straightening production than can be otherwise obtained. It straightens by pulling the point of greatest runout downward, instead of pressing it downward, using special pulling hooks for the purpose.

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Fig. 13—A flexible power press of 15-ton capacity, equipped with center attachment of the lock lever type, engaged in straightening crankshafts. Illustration courtesy General Manufacturing Company.

tive speed of this machine is the fast method it incorporates for finding the point of greatest runout. In the case of straightening crankshafts, for instance, after the part is engaged between a pair of centers for rotating, a battery of dial indicators (so arranged that there is an indicator in positional registration with each intermediate main bearing) is lowered against a stop. Thus, by rotating the crankshaft, it can be immediately discovered where the greatest amount of runout is located longitudinally as well as radially.

When this point is found, the indicators are raised out of the way. There is a hook which is then drawn forward over this point of greatest runout. By merely pushing a button, the hook, actuated by an eccentric shaft below the workpiece, pulls down on the shaft until the pushbutton is released. There is a large dial mounted above and at one end of the unit, by means of which the operator can tell how much deflection is being applied to the part. Therefore, he knows just when to release the button. The centers between which the workpiece is

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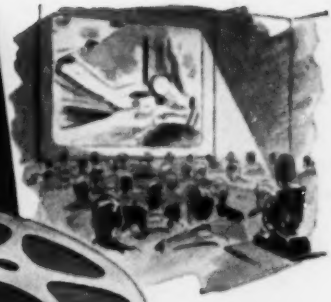
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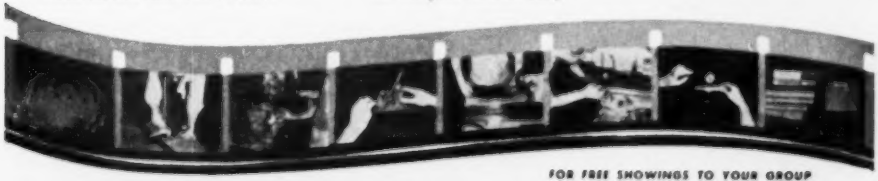
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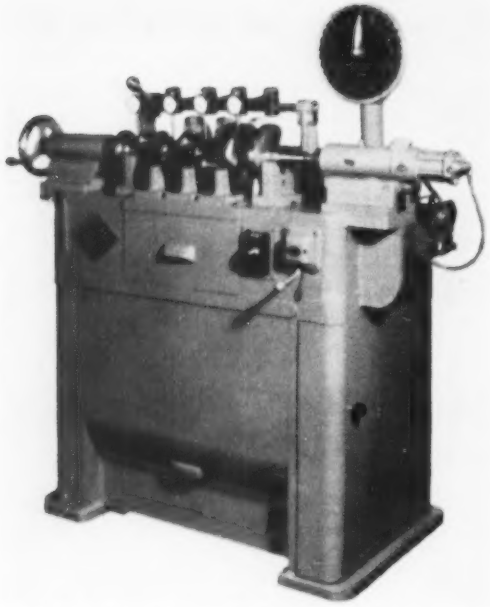


Fig. 14—View of highly interesting and efficient straightening machine, which straightens crankshafts or other work for which it may be particularly built. This type of machine is individually engineered for a specific type of part. The machine shown is for crankshafts. Note that there are four separate dial indicators engaging different crankshaft bearings at the same time, and thus the location of the greatest amount of runout is detected immediately. Illustration courtesy Industrial Metal Products Corporation.

held are spring-loaded, so when the pull comes on the hook, they yield, allowing the part to take its straightening bearings in two vee blocks, located under the front and rear journals of the crankshaft.

Part III of this series will appear in the May issue.

Die Casting. By H. H. Doehler. Published by McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 18, N. Y. 502 pages. Illustrated. Cloth binding, board covers. Price, $8.00.

In this volume, the author provides an authentic and thorough analysis and survey of the entire die casting process. He presents a clear picture of the virtually unlimited possibilities of die casting as a fabricating technique, discusses the production, engineering, design, and materials of die casting, and points out probable trends and developments in the near future. Each aspect of the subject receives full treatment slanted to meet the needs of metallurgists, equipment and product designers, production supervisors, engineers, and others directly engaged in the design, production, and use of die casting equipment.

The book provides production data on hydrauliscope analysis of injection processes, automatic ladling, die selection, and die manufacturing, as well as other phases of die casting. It describes common practices for machining and hobbing dies, methods of metallurgical control of die steels, and heat treatment of dies. Also provided are practical data on the cause and cure of erosion, heat checks, cracking, and wear of die steels.

Special features include a practical discussion of the economic design of die castings, how to estimate die casting costs, and what to include on drawings of parts to be cast. Multiple-cavity dies and unitized die construction, as well as simple single-cavity units, are treated in detail. Considerable attention is given to the finishing of die castings. A final chapter is devoted to "Safety in the Die Casting Plant."

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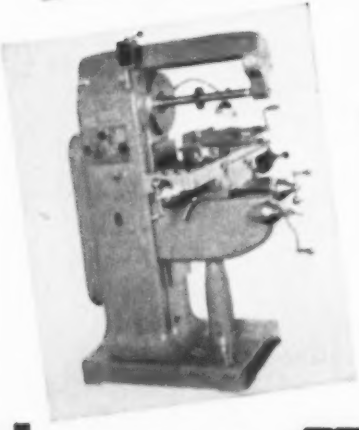
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Fig. 1—Parts intended for Sequential Sampling inspection are first placed on a specially prepared inspection table.

Sequential Sampling Simplifies Receiving Inspection

The method of selecting a few parts from each shipment received and basing the quality of the entire lot on the quality of samples selected at random.

By Gilbert C. Close

SEQUENTIAL sampling in receiving inspection, while being used in relatively few plants to date, is proving extremely reliable and a great time-saver wherever it is being intelligently applied. In fact, reliability of the method is a foregone conclusion. Results are based on the infallible mathematical law of averages. From a less scientific standpoint, it is more simple to say: "You don't have to eat all of an apple in order to find out that it sour."

Large machine shops are finding this new receiving inspection technique exceptionally well adapted to their needs. Stock items such as washers, nuts, screws, studs, standard bushings and bearings, and even tool supplies such as drills, files, and other tools purchased in volume, can be checked for an average level of quality in a few minutes, and without the tedious rou-



Fig. 2—Parts are next spread over the surface of the table until they are not more than ten deep at any point.

tine of inspecting each part individually.

The sequential sampling method of receiving inspection was developed by Mr. A. Wald of the Office of Scientific Research and Development during World War II. Initial purpose of the technique was to reduce the tedious and time-consuming task of inspecting individually thousands of similar parts received as military and naval equipment. The value of the technique to arrive at reliable conclusions from a minimum of data was considered so great at the time that information relative to its use was classified as "Restricted" within the meaning of the Espionage Act.

When the procedure was released from that classification, a series of pamphlets describing its application to various inspection problems was



Fig. 3 — Illustration showing method of dividing parts into equal sections.



Fig. 4—Parts are divided into eight equal sections as shown in this illustration.

prepared by the Statistical Research Group of Columbia University for the Applied Mathematics Panel, National Defense Committee, Office of Scientific Research and Development. These pamphlets were titled "Sequential Analysis in Inspection and Experimentation" and were later published by the Columbia University Press.

It has since been proved that by using these methods and formulae different sampling procedures may be devised that will materially reduce the time and work required for receiving inspection. With proper care in applying the sequential sampling procedure, a definite level of quality control can be obtained. Results obtained by the procedure have been sufficiently accurate to justify its use in large airplane plants manufacturing airplanes to strict government and military specifications.

Basically, sequential sampling consists of selecting a few parts from each shipment received and basing the quality of the entire lot on the quality of the samples selected at random. The procedure takes into consideration that each part will be handled again by various workmen and examined again

Table I

AVERAGE OUTGOING QUALITY LEVEL 3% FOR AVERAGE DIMENSIONS OF MAJOR IMPORTANCE LOTS 1 to 99		
LOT SIZE	SAMPLE SIZE	
5	5	Accept if no rejections are found. If one rejection is found, inspect one hundred per cent or reject all.
10	8	
15	10	
20	12	
25	13	
30	15	
35	16	
40	17	
45	18	Accept if no rejections are found. If one rejection is found, select another sample of the same size and inspect. If no rejections are found in second sample, accept the lot. If one rejection is found in second sample, reject the lot or inspect one hundred per cent of parts.
50	18	
55	19	
60	20	
65	20	
70	21	
75	22	
80	22	
85	23	
90	23	
95	24	
99	24	
NOTE: All samples must be drawn on a random basis.		



Fig. 5—Samples, selected in sequence and at random, arranged on the Sequential Sampling mat and ready for inspection.

during final inspection. The desired level of average quality obtained by sequential sampling must be such that the cost of replacing and discarding parts subsequently found to be defective will be substantially less than the cost of 100-per cent source inspection at the time the parts are received. Thus it is evident that in sequential sampling the danger of having a few defective parts get by the receiving inspector is considered. But the costs accruing from these calculated errors will be less than the cost of 100-per cent inspection.

In setting up sequential sampling techniques, a definite plan must be prepared for each inspection problem.





Fig. 6—Inspection proceeds. The most important quality requirement is checked first, then the second, and so on. Inspection is continued until all quality requirements have been checked or until it is decided to reject the lot.

Fig. 7—Noting results of the inspection of the Sequential Sampling inspection form. Note that in this case two nuts have been rejected and placed aside under REJ.

This plan first establishes a definite and desireable level of quality. It does not matter how high or low this level is as long as it can be stated numerically. Examples in this conjunction could be: (1) acceptable percentage of defective parts (such as 2% defective in a lot); (2) average measurements (physical and dimension-wise) to which the parts must conform; (3) average weight; and (4) permissible standard deviations. Other factors pertaining to quality and that can be expressed numerically can be used.

The second part of the plan requires a definite decision on the amount of inspection necessary to maintain the desired level. This is the level of confidence the inspector is willing to place in the sequential sampling procedure, which in turn is based on his knowledge of the average quality supplied by various vendors and his willingness to accept a certain percentage of lots with more than the usual number of defectives.

It is characteristic of the sequential sampling plan that the higher the levels of quality and confidence, the more inspection is required. If the inspector wishes to reduce the number of defectives that get by receiving inspection, he must pay for it by providing a more sensitive inspection procedure. A cardinal rule of sequential sampling, a rule that provides for the mathematical accuracy of the technique, is that while **more** parts than the original plan stipulates may be inspected, **less** inspection must not be permitted. When less inspection is given, the number of defectives that get by may result in greater end costs than 100 per cent inspection at the source. This would defeat the entire purpose of the sequential sampling plan.

By establishing percentage measures of quality and confidence, and by using them as directed in the formulae and methods described in the pamphlets published by the Columbia University Press, an inspection plan of any desired sensitivity may be designed and used. In adopting the sequential sampling inspection techniques at the El Segundo plant of Douglas Aircraft Company, Ralph A.

Table II

AVERAGE OUTGOING QUALITY LEVEL - 3%
LOT SIZE 100 to 499

SAMPLE NUMBER	FIRST CLASS			SECOND CLASS			THIRD CLASS		
	SAMPLE SIZE	ACCEPT	REJECT	SAMPLE SIZE	ACCEPT	REJECT	SAMPLE SIZE	ACCEPT	REJECT
1	3	x	3	8	x	3	14	x	4
2	3	x	3	8	x	4	14	x	5
3	3	x	3	8	0	4	14	0	5
4	3	0	3	8	0	5	14	1	6
5	3	0	3	8	1	5	14	1	7
6	3	0	3	8	1	5	14	2	8
7	3	0	4	8	1	6	14	3	8
8	3	0	4	8	2	6	14	4	9

NOTE: All samples must be random
x - Insufficient for a determination. Take another sample before accepting.

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Wood, Jr., Advisor on Statistical Quality Control, has this to say regarding development of the Sequential Sampling Plan:

"It was decided, after much experimentation and many conferences, that the bulk of materials received at the El Segundo plant would be acceptable if, on the average, no more than three per cent in quality were defective on each quality characteristic tested . . . This decision that a product contain no more than three defectives in a hundred was adopted because we knew we could throw away such defectives when they were later discovered far cheaper than we could inspect for them in the receiving room. Accordingly, this plan was devised as a minimum inspection standard to be used in all cases except where 100 per cent inspection was specifically required.

"The quality offered by some of our suppliers is consistently high; we need inspect only enough of their product to make sure that it does not fall below our required quality level. Some of our suppliers offer spotted quality, and their products must be inspected enough to assure acceptance of good lots and rejection of the bad. When the quality generally supplied by a vendor is unknown to us, we must give still more inspection until we obtain a confidence level in his products.

"In order to take advantage of the consistent high quality of some vendors and not be too badly fooled by the bad lots supplied by others, we have divided our inspection requirements into three classes, the sensitivity of each dependent upon the reliance we can place in our ability to catch a bad lot of products when it is received. Accordingly, our confidence level, or risk of accepting a bad lot sent in by a good supplier is set at 50 per cent. This is our first class, and requires very limited inspection. Our second class, with the risk of accepting a bad lot set at 25 per cent, requires about three times the amount of inspection as the first class. Our lowest class, with which we take a 10 per cent risk of accepting a bad lot, and which is used on vendors about whom we know very little, requires eight times the amount of inspection

Table III

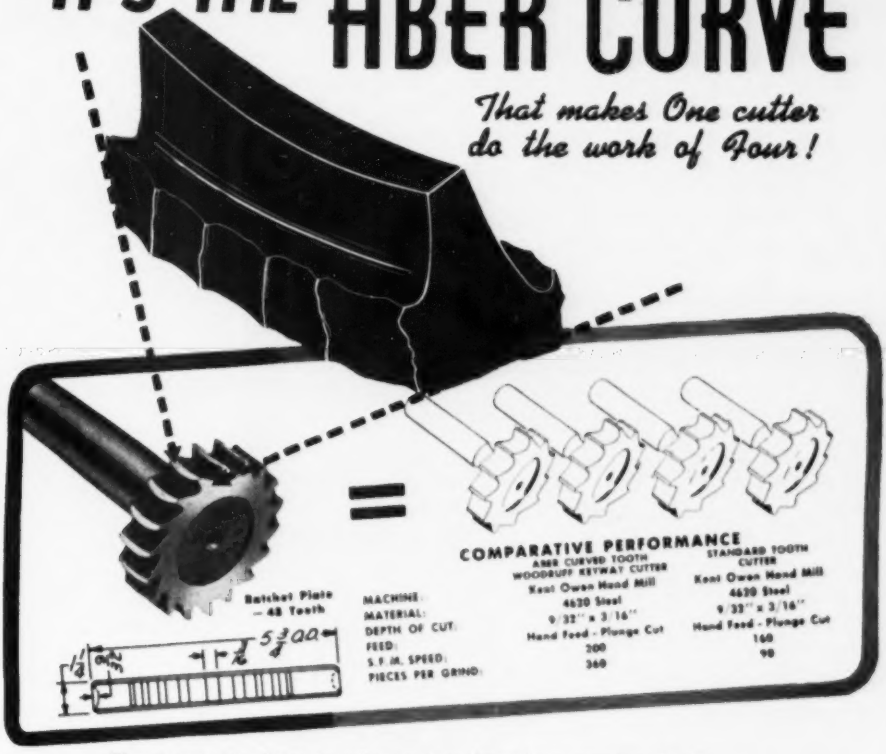
AVERAGE OUTGOING QUALITY LEVEL - 3%
LOT SIZE 500 to 999

SAMPLE NUMBER	FIRST CLASS			SECOND CLASS			THIRD CLASS		
	SAMPLE SIZE	ACCEPT	REJECT	SAMPLE SIZE	ACCEPT	REJECT	SAMPLE SIZE	ACCEPT	REJECT
1	4	x	3	10	x	4	20	x	4
2	4	x	3	10	x	4	20	x	5
3	4	x	3	10	0	5	20	0	6
4	4	0	4	10	0	5	20	1	7
5	4	0	4	10	1	6	20	2	8
6	4	1	4	10	1	6	20	3	9
7	4	1	4	10	2	7	20	4	10
8	4	2	5	10	2	7	20	5	11

NOTE: All samples must be random
x - Insufficient for a determination. Take another sample before accepting.

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That makes One cutter do the work of Four!



Yes, in an actual test in a large pipe threading company's shop, ONE Aber Curved Tooth Woodruff Keyway cutter performed the work ordinarily requiring FOUR cutters of standard tooth design. This 400% increase in cutter performance is by no means unusual, for Aber's exclusive curved tooth design permits a smoother finish, absence of chatter, greatly increased cutter life, and cuts more freely with far less hand pressure from the operator. In addition, it proved to be a tremendous saver of "down" time, and reduced costs in the cutter grind room.





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accorded the first class. Even then it is interesting to note that our third class inspection costs, on the average, are about one-third the costs of 100 per cent inspection."

The Douglas El Segundo plan, developed by Ralph Wood and submitted herewith, has one feature not usually found in a Sequential Sampling Plan. It designates the exact manner in which a random sample is to be selected from any lot, regardless of its size. The plan provides also for different sized samples from different sized lots. It is felt that this improves the ability of the plan to proceed with due uniformity and caution.

It is important to note that this plan is designed as a **minimum inspection** standard. No product is to receive less inspection than required by the plan, while any product about which some doubt exists, which will not receive subsequent inspection, or which is highly critical in nature, can receive as much more inspection as deemed necessary under the circumstances.

As written in article form, the Sequential Sampling Inspection techniques sound extremely complicated. The reverse is true. Once the plan is established, the step-by-step procedures are easy to accomplish and result in less work, less time expended, and less costs than 100 per cent source inspection. At the same time any desired average quality level of parts received and accepted may be maintained. readily.

The "Instructions for Sequential Sampling



- Full Line Capacity
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- Low First Cost
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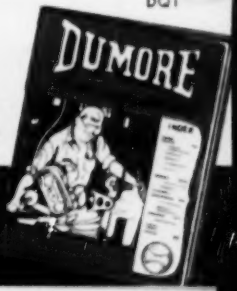
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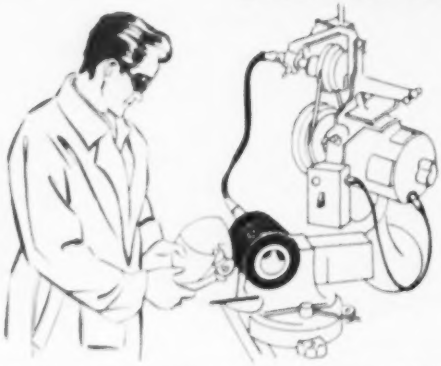
Inspection" furnished each Douglas inspector begin with the following two explanatory paragraphs:

"**A.** Sequential Sampling Inspection is a scientific method of inspection. It is a method which uses system and organization to replace the drudgery of 100 per cent inspection. It is an accurate method which gives precise results. In order to achieve the accuracy and precision necessary, Sequential Sampling Inspection must be carried out exactly as it is planned, substituting nothing and leaving nothing out.

"**B.** A.O.Q.L. means Average Outgoing Quality Level. It means that if a Sequential Sampling Inspection Plan with a certain A.O.Q.L. rating is used to inspect certain products, the product, when accepted, will, on the average, contain no greater percentage of rejectable parts for the particular quality specification to which the plan is applied than that stated in the rating. It is important to note, however, that the plan ALWAYS provides for the MINIMUM amount of inspection NECESSARY to achieve a particular A.O.Q.L. rating. Any more or less inspection is certain to change the rating. Almost always this change is for the worse."

Each Douglas inspector qualified to use Sequential Sampling Inspection is supplied with a set of instructions, a set of six Sequential Sampling Inspection Tables, and a pad of Sampling inspection forms. The six Tables, each designed for an A.O.Q.L.

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THE WHEEL WITH THE PNEUMATIC DRUM

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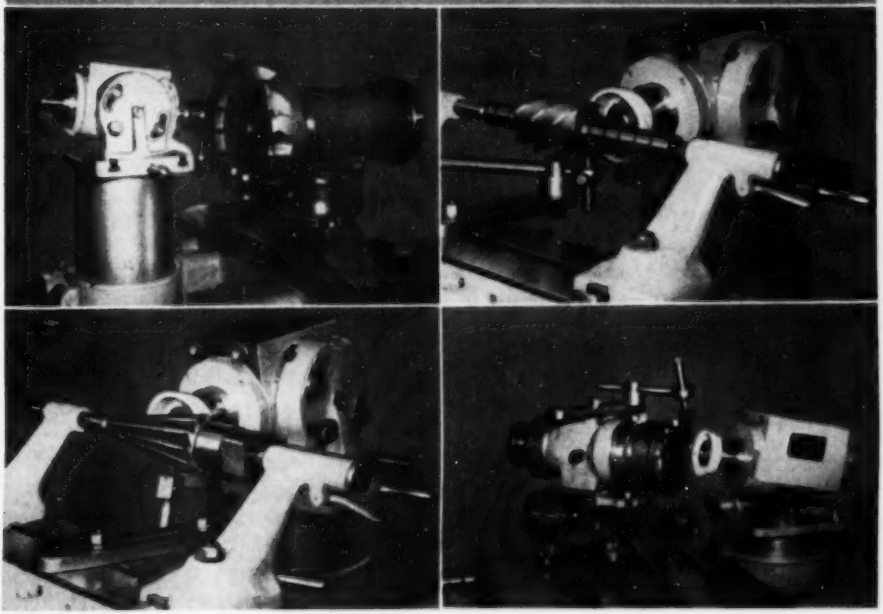


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POPE Spindles have the radial and axial rigidity to make wheels cut faster — spark out quicker. Grinding time is reduced. Softer wheels can be used for cooler grinding and for producing the kind of cutting edge that stands up.

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Table IV

AVERAGE OUTGOING QUALITY LEVEL - 3%
LOT SIZE 1000 to 1999

SAMPLE NUMBER	FIRST CLASS			SECOND CLASS			THIRD CLASS		
	SAMPLE SIZE	ACCEPT	REJECT	SAMPLE SIZE	ACCEPT	REJECT	SAMPLE SIZE	ACCEPT	REJECT
1	8	x	4	20	x	5	35	x	6
2	8	1	5	20	0	6	35	1	8
3	8	1	5	20	1	8	35	2	10
4	8	1	5	20	2	9	35	4	12
5	8	1	6	20	3	10	35	6	14
6	8	1	6	20	4	11	35	7	16
7	8	2	7	20	6	12	35	10	18
8	8	2	7	20	8	13	35	12	20

NOTE: All samples must be random
x - Insufficient for a determination. Take another sample before accepting.

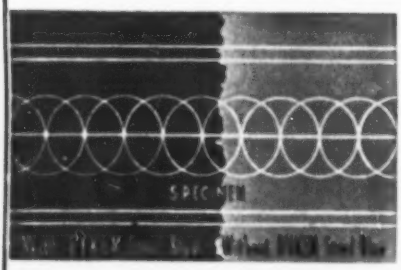
of not over 3 per cent of defective parts, are set up for the following lot quantities:-

Table Number	Lot Quantity
I.	1 to 99
II.	100 499
III.	500 999
IV.	1000 1999
V.	2000 3999
VI.	4000 25000

With the exception of Table No. 1, designed for lot quantities under 100, each table is divided into three sections:-

1. First Class Vendors
2. Second Class Vendors
3. Third Class Vendors

The first class table is used on products received from a proven vendor—one in whom the company has established confidence. Second Class is reserved for vendors whose general quality level is unknown. All vendors fall in this class until 10 consecutive acceptable lots have been received. If at any time a rejectable lot is received from a First Class Vendor, he is dropped to Second Class until 10 consecutive acceptable lots have been received. Third Class is received for vendors who are suspected of faulty products, and in whom the inspector has little confidence. Here again the vendor may boost his classification by supplying consecutive good lots of products.



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Simply brush on, right at the bench; ready for the layout in a few minutes. The dark blue background makes the scribed lines show up in sharp relief, and at the same time prevents metal glare. Increases efficiency and accuracy.

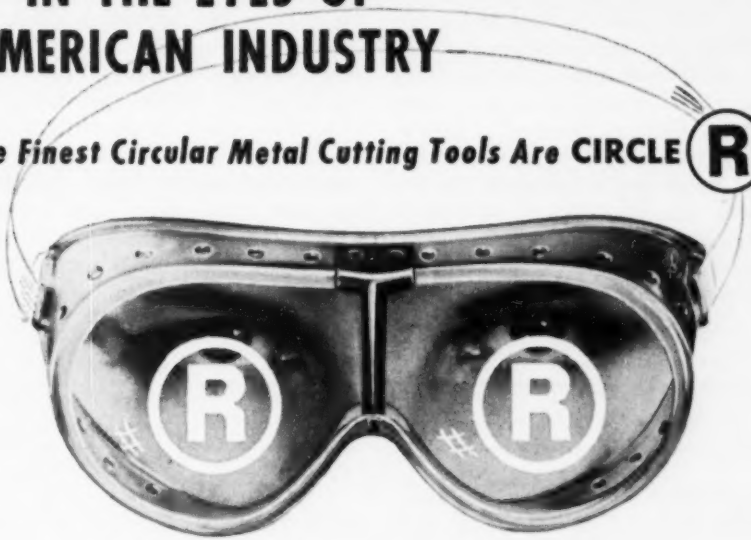
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THE DYKEM COMPANY

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The particular table to use in each case is determined by the inspector, and this depends upon the number of parts to be inspected. Each vendor classification on the table is divided into three columns showing: (a) Sample Size to be drawn at random from the lot being inspected; (b) the acceptance number (explained later); and (3) the rejection number (explained later).

The inspector first prepares a form at random from each of the eight divisions on the sampling table. The size of the sample is found in the "Sample Size" column of the applicable Sampling Table, and depends, of course, on the number of parts in the lot and the classification of the vendor. (The six Sampling Tables used by the Douglas El Segundo plant are duplicated with this article). A random manner of selection is used. There is no attempt to pick good or bad ex-

Table V

AVERAGE OUTGOING QUALITY LEVEL - 3%
LOT SIZE 2000 to 3999

	FIRST CLASS			SECOND CLASS			THIRD CLASS		
SAMPLE NUMBER	SAMPLE SIZE	ACCEPT	REJECT	SAMPLE SIZE	ACCEPT	REJECT	SAMPLE SIZE	ACCEPT	REJECT
1	15	x	5	30	x	7	50	x	8
2	15	0	6	30	0	8	50	0	11
3	15	1	7	30	2	10	50	4	13
4	15	2	8	30	4	11	50	6	16
5	15	2	8	30	5	13	50	9	18
6	15	3	9	30	6	14	50	12	21
7	15	4	10	30	8	16	50	14	24
8	15	5	11	30	10	18	50	17	26

NOTE: All samples must be random
x - Insufficient for a determination. Take another sample before accepting.

by filling in the following headings: (1) Date; (2) Part Number; (3) Part Name; (4) Part Quality; (5) Order Number; (6) Serial Number; (7) Vendor's name, or department making the part; and (8) Vendor's Address.

With the form properly filled in, the parts are taken from their container and placed on a specially prepared table as shown in Figure 1. These parts are then carefully spread over the top of the table so that they are not more than ten deep at any place. (See Fig. 2). Next, the parts are divided into eight approximately equal divisions as shown in Figs. 3 and 4.

One sample quantity is then selected amples. These samples are then placed on a Sampling Inspection Mat, as shown in Fig. 5, in the square corresponding to the same section on the Sampling Table. Such mats are easily prepared from a piece of wrapping paper and properly ruled.

Inspection of the samples is now conducted. The inspector proceeds from the most important quality measurement to the least important, or until such a time that he determines to reject the lot. The samples are inspected in rotation, beginning with Number 1 and proceeding through each succeeding sample until Number 8 has been reached. When a determination

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Since the inception of this business, we have used only steel containing chromium and/or tungsten • That's why A·B·C Bushings deliver as much as 10% longer service than the average • When a supplier decides to "up" the quality of his steel, it may be a couple of years before his customers get the benefit of the change, their orders in the meantime being filled from stock or blanks antedating the improvement • With A·B·C Bushings, steel of chromium and/or tungsten content is no recent innovation. They've *always* been made from this superior grade steel • That's why it is always good business to specify A·B·C.



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Table VI

AVERAGE OUTGOING QUALITY LEVEL - 3%
LOT SIZE 4000 to 25,000

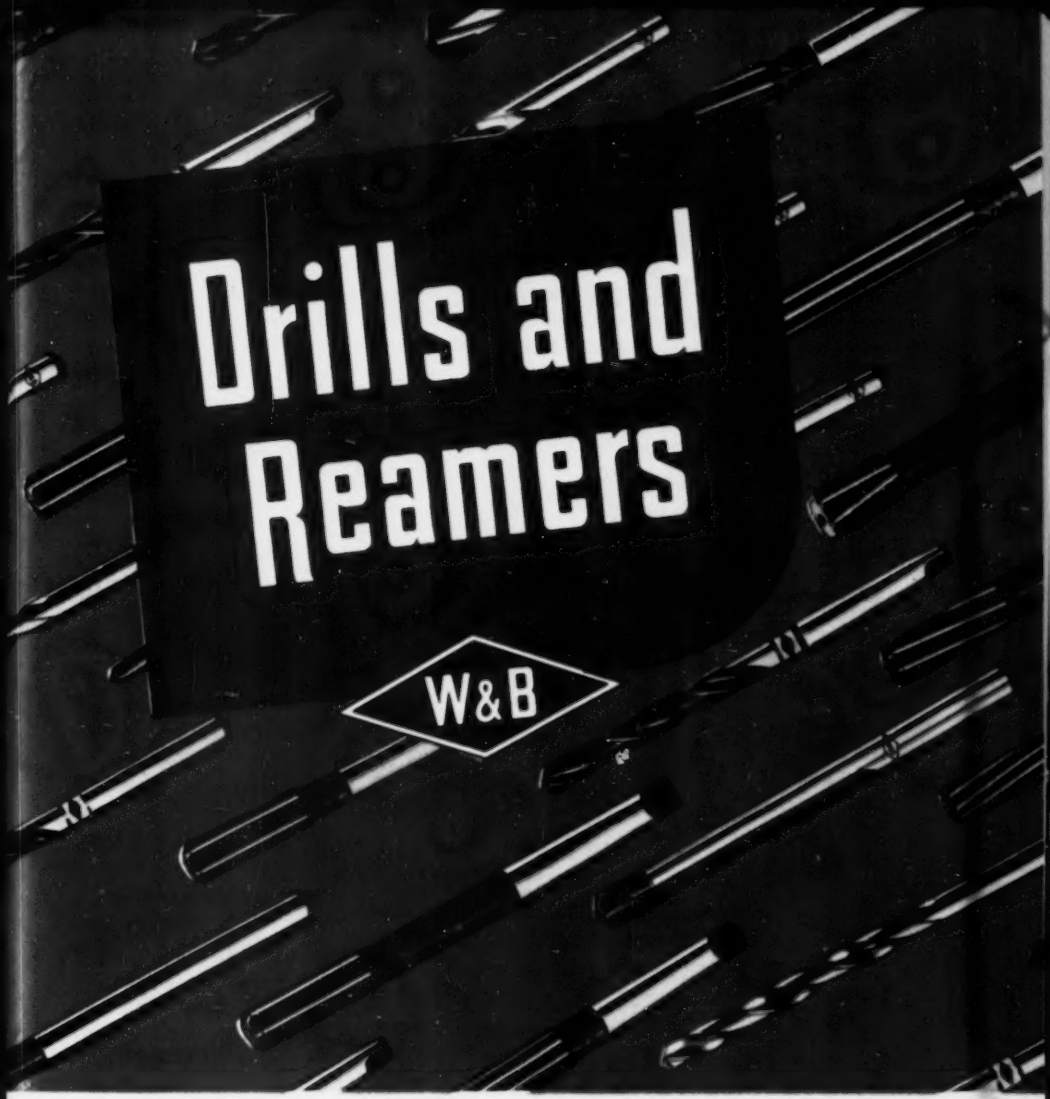
SAMPLE NUMBER	FIRST CLASS			SECOND CLASS			THIRD CLASS		
	SAMPLE SIZE	ACCEPT	REJECT	SAMPLE SIZE	ACCEPT	REJECT	SAMPLE SIZE	ACCEPT	REJECT
1	20	x	6	60	x	11	75	x	11
2	20	0	8	60	3	15	75	3	15
3	20	1	9	60	6	17	75	7	19
4	20	2	10	60	9	20	75	11	23
5	20	3	11	60	13	24	75	15	27
6	20	4	12	60	16	27	75	17	30
7	20	6	13	60	19	30	75	23	34
8	20	8	14	60	22	33	75	27	37

NOTE: All samples must be random
x - Insufficient for a determination. Take another sample before accepting.

has been reached in regard to one quality specification, the next specification is checked using the same sequential routine.

Determination of the "Acceptance Number" is reached when the cumulated number of rejected parts found in the samples is equal to, or less than the quantity noted in the "accept" column of the Sequential Sampling Table being used. The determination of "Rejection Number" is reached when





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the cumulated number of rejected parts found in the samples are equal to or more than the quantity noted in the "reject" column of the Table. Infrequently, a determination will not be reached by proceeding once through the samples. When this happens, a determination is made on the basis of the next more critical table, using the information already recorded from the samples tested.

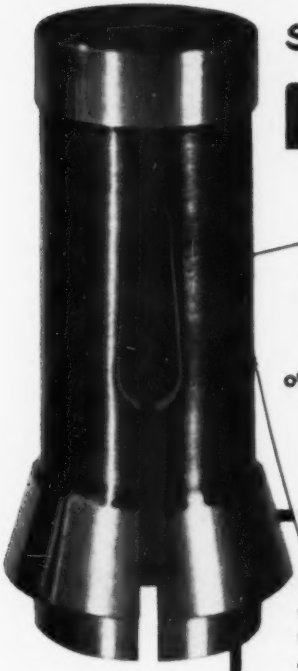
All rejected parts are kept separated from the accepted parts while sampling. When a determination is reached to accept the lot, the rejected parts are packaged along with a notation of why they were rejected. When any part is rejected from one of the eight divisions on the Sampling Mat, it is replaced by another part selected from the main lot in order to keep the sample size the same for subsequent quality determinations.

When all specifications have been checked and the results are recorded, the report is signed by the inspector. The lot is then accepted or rejected on the basis of this report.

In operation, the Sequential Sampling Plan is both simple and effective. A good plan is based on the certainty of mathematical calculations, and when properly applied, cannot go wrong. Without doubt, as more and more machine shops are drawn into the defense setup in the role of subcontractors, and with produc-



"We've reduced machining costs plenty since we switched to ANTISEP BASE*!"



PRODUCTION DATA

PART: Collet

OPERATIONS: Forming, deep drilling, chamfer, boring and cut-off

MACHINE: 3" Conomatic

METAL: Hy-Ten Steel - "H" temper (Surface speed is 85 feet per minute, .005 feed)



Reports
Midwest Collet
Manufacturer

● This company was dissatisfied with the cutting oil they had been using. Results didn't justify exceptionally high costs. When they changed to Antisep Base—mixed 1 to 25 parts water—they got the good performance they were after, with an annual saving of $350. per machine!

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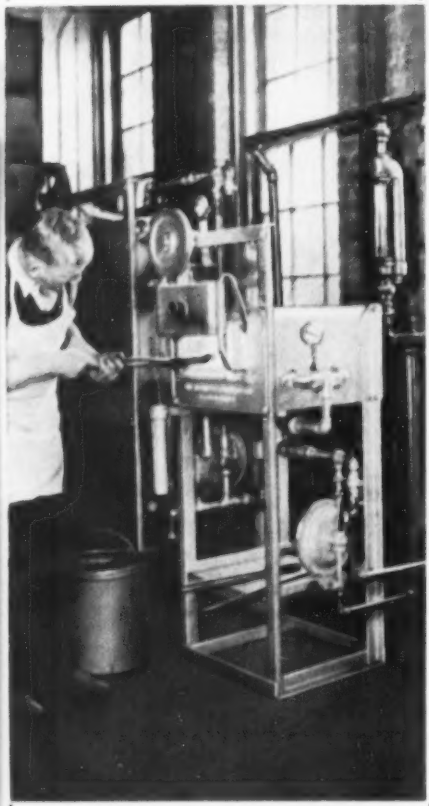
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tion composed mostly of mass quantities of similar products, use of the Plan will become widespread. It has already proved itself to be both a cost-and time-saver wherever used. Others can enjoy the same advantages by adopting it and giving it intelligent application.

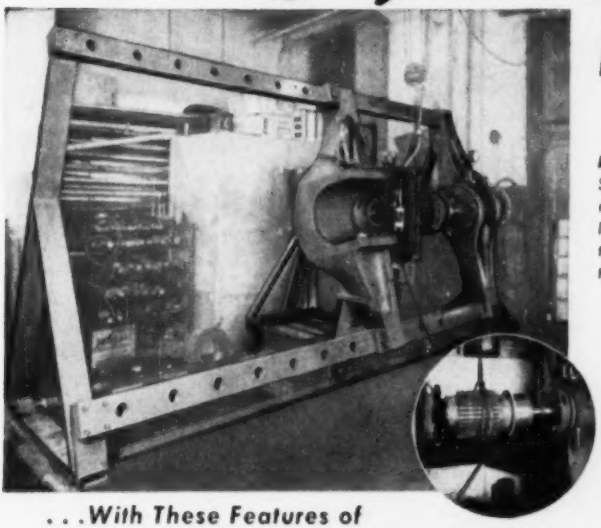
Buyers' Guide for Design of Screw Machine Products. Second Edition. Distributed by National Screw Machine Products Association, 13210 Shaker Square, Cleveland 20, Ohio. 20 pages. Illustrated. Heavy paper covers. Price, 25 cents.

Prepared by the Committee on Manufacturing Standards of N.S.M.P.A., this guide is intended to help the buyers and designers of screw machine products by presenting suggestions for the practical and economical designing of such products. In simple, easy-to-understand language the booklet presents the important factors that must be considered when purchasing screw machine products and is designed to eliminate difficulties which have arisen in the past because of the simple fact that buyer and seller of screw machine products were not talking the same language or thinking in the same terms.

For further information on any product mentioned in this issue—use the READER SERVICE CARDS between the covers.

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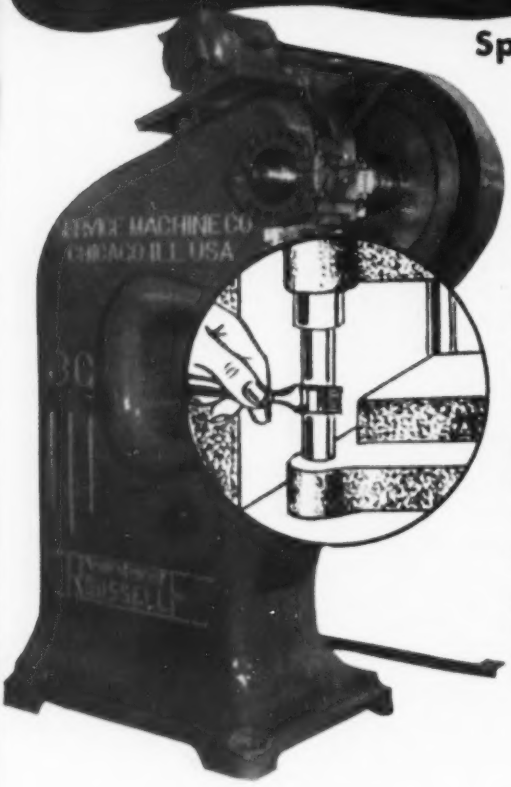
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C. W. Hinman

Progressive Dies and Their Machines

Several particular designs of progressive dies are discussed, as well as high speed dieing machines and an automatic feeding unit.

By C. W. Hinman
Designing Engineer

THE first four figures in this article serve to illustrate several recent designs of progressive dies for use in the blanking, forming, and piercing of workpieces. The first three figures were furnished through the courtesy of E. V. Crane, chief engineer of the Hydraulic Press Manufacturing Company, and are published here by his consent. These illustrations are good examples of modern progressive dies designed for use in fabricating parts in successive order.

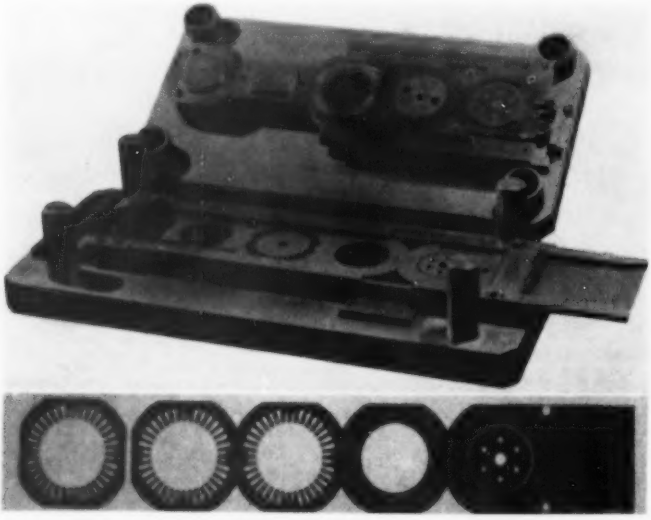


Fig. 1 shows a die for producing circular laminations for electric motors on a large volume basis. The operation is performed with the aid of a combination entering roll feed and synchro-

Fig. 1 — Progressive die for producing circular laminations for electric motors on a volume basis. Illustration courtesy E. W. Bliss Company.



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Specifications		
Model	**Size**	**Bit Capacity**
60	0	1/8 to 5/16
61	1	3/16 to 3/8
62	2	1/4 to 1/2
64	4	5/16 to 5/8

With 15° or parallel cutter channel, left or right hand

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SPECIFICATIONS			
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Diam.	Lgth.		
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1/4	6	1/8	P60R, P61R, P62R
3/8	7	3/16	P61R, P62R, P64R
1/2	8	1/4	P62R, P64R

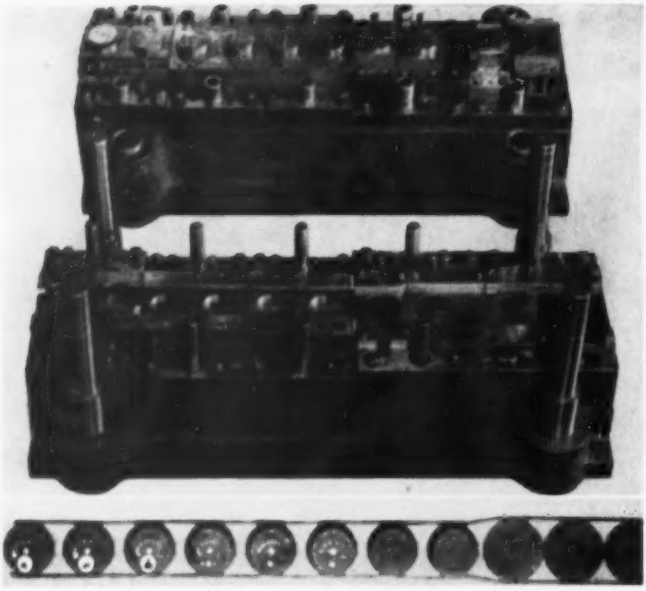


Fig. 2 — Progressive die with individual die sets for easy replacement of worn sections or die changes. Illustration courtesy E. W. Bliss Company.

nized pull feed which makes it possible to eliminate both center and edge scrap. Difficulties in holding down the stock blanks, which are sheared all around, are overcome by the use of a positive hold-down device.

Fig. 2 shows well planned and executed die sets within a die set for easy replacement of worn sections or changes in the die and for increased accuracy of work. The part produced with this die is in high demand for communication sets. Savings in cost in producing this part are particularly high since the die eliminates a number of work handling steps.

Fig. 3 provides a close-up view of a progressive die for producing two brass spring-clips per press stroke. The scrap strip is shown at the right side of the die. Samples of the workpieces lie on the die shoe.

Fig. 4 shows a double roll feed arranged to feed from front to back on a straight side press. Notice that the front unit is mounted on a hinge so that it can be swung aside to permit die setting. The front feed in this case is equipped with a seven-roll stock straightener, necessary because coiled

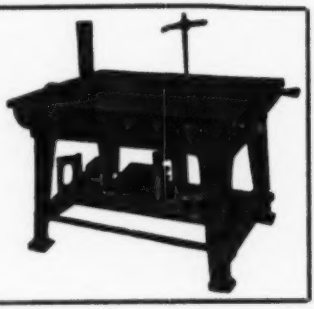
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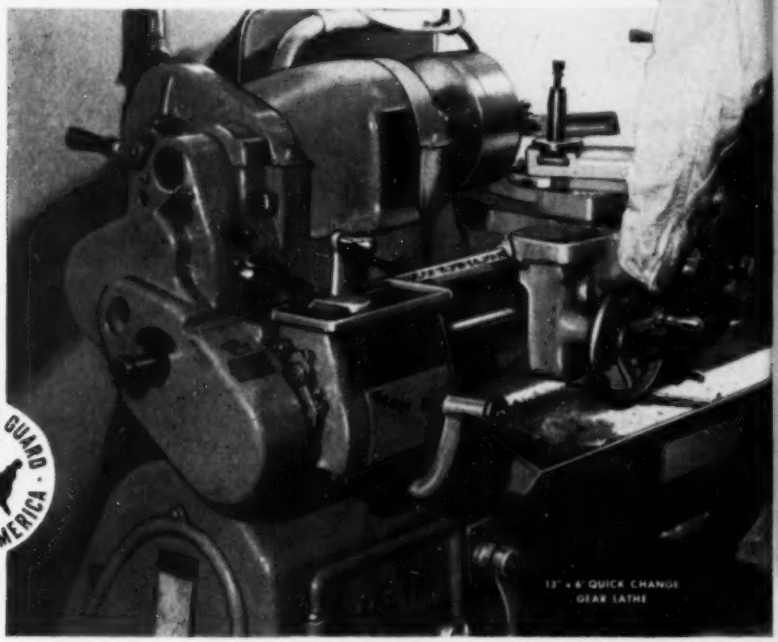
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SPINDLE SPEEDS: Eight . . . . 40 to 940 r. p. m.
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POWER CROSS FEEDS: 48 . . . . .0006 to .0312"
THREAD CUTTING: 48 R. H. or L. H. pitches . . . 4 to 224 per inch
CROSS SLIDE TRAVEL . . . . . 8-1/8 inches
TAIL STOCK SET OVER . . . 15/16"

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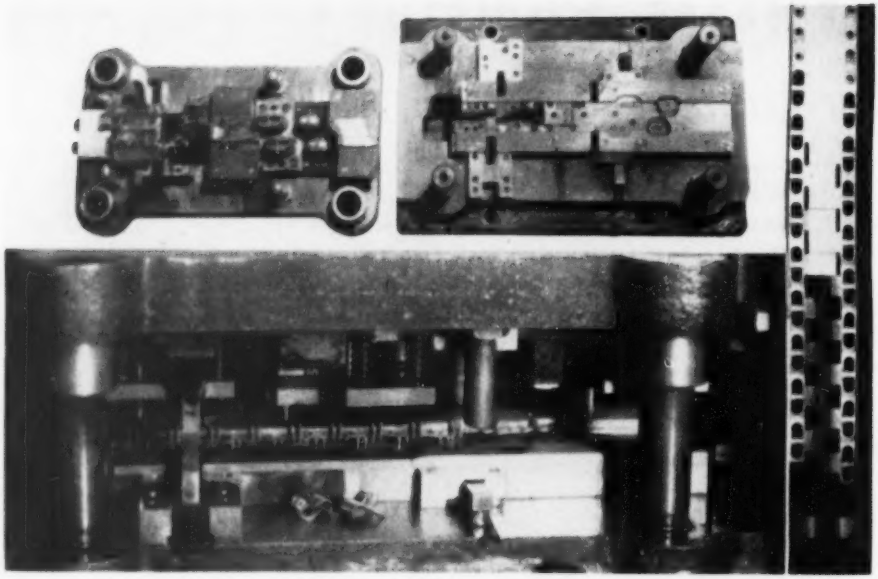
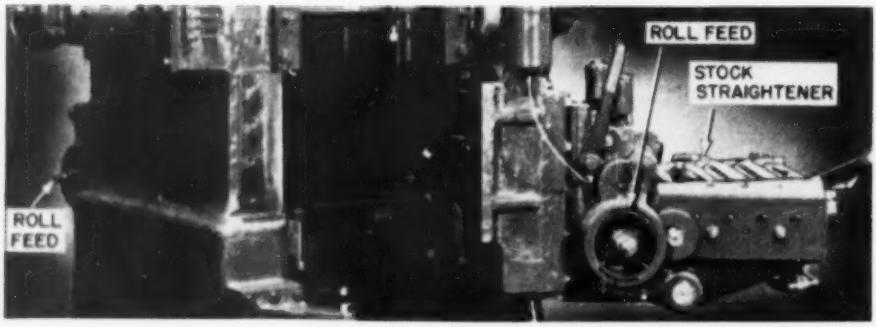


Fig. 3—Close-up view of progressive die for producing two brass spring-clips per press stroke. Illustration courtesy E. W. Bliss Company.

stock is used.

These machines are one of several types well adapted for operating progressive dies. Illustrated in Fig. 5 is a 50-ton dieing machine which can be set up with feed rollers at both its receiving and delivery ends. Other types of dieing machines include the Speed-master, double-crank machine, and the 150-ton wide-bed type machines. A feature of these machines is their low height resulting from a construction whereby the ram is pulled down into action by four pull rods, one at each corner of the ram. This design provides for unusually close guiding of the

Fig. 4—Double roll feed arranged to feed from front to back on a straight side press.



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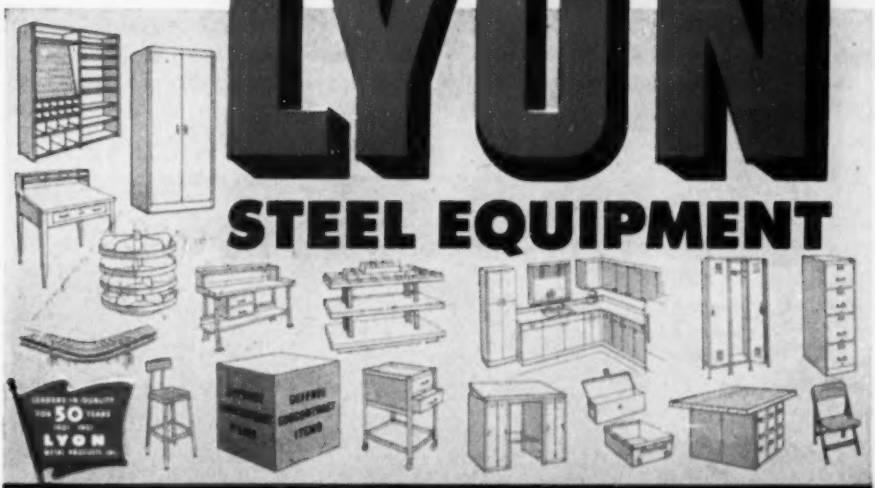
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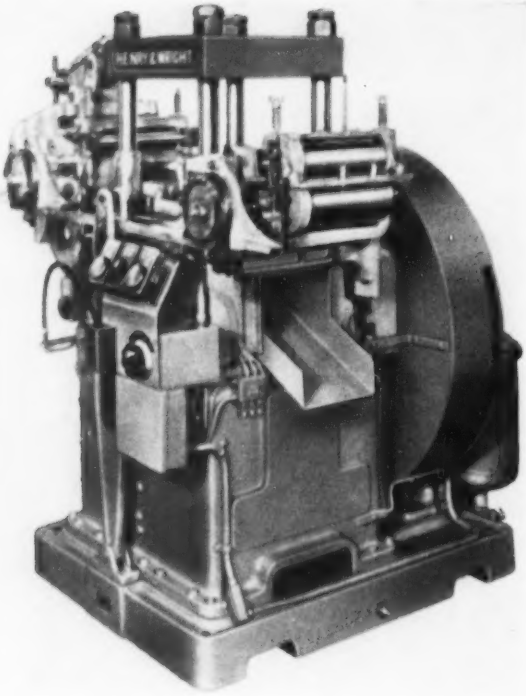


Fig. 5—Fifty-ton dieing machine set up with feed rollers at both its receiving and delivery ends.

punches into the dies.

Dieing machines are equipped with automatic double-roll feeds, a scrap cutter, variable speed drive, pneumatically-actuated friction clutch with push-button control at the front of the machine, and a pneumatic counterbalance for reciprocating parts.

machines have made high-speed records for themselves in the output of radio parts and similar work and especially for E and I laminations in carbide equipped dies for the production of transformer coils.

Automatic Feeding Unit Speeds Up Stock Feeds

The recently improved automatic Feedmaster operates entirely by compressed air, including both the feed head and hold head grippers, as well as the horizontal stroke mechanism. The feeding stroke is activated by a horizontal double-acting cylinder, to the ends of which the air hoses are attached. The cylinder feeds the stock in

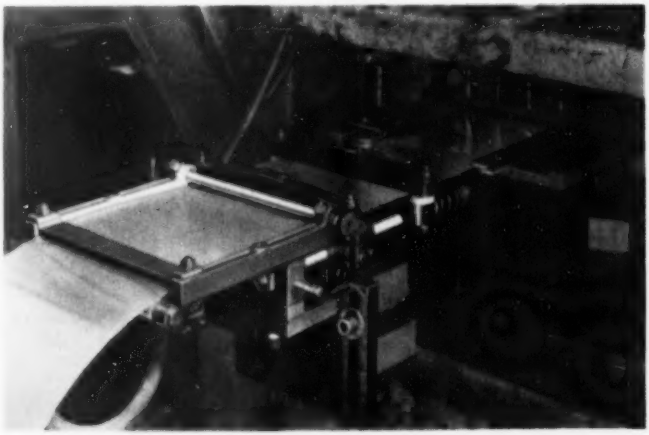
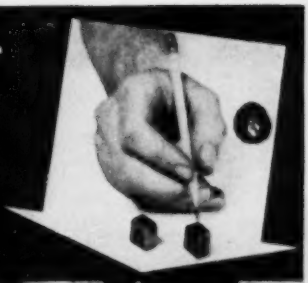
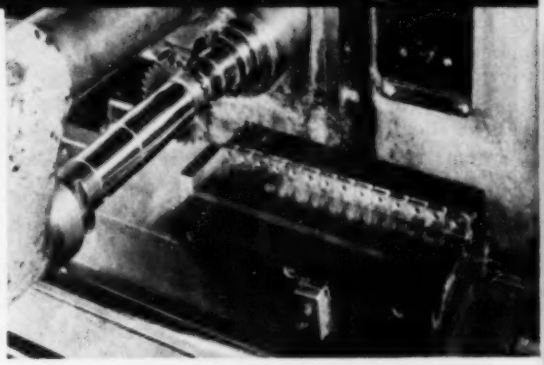


Fig. 6 — Feedmaster automatic feeding unit mounted on a press for feeding 8-in. width aluminum alloy strip.

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Close-up showing method of holding work in Sundstrand Magnetic Chucks.

Here's a good example of the production help you can get with Sundstrand Magnetic Chucks. This chuck, with adaptor plate, side locator and end stop, holds 14 pieces in a row for milling a slot 3/32" wide x 1/2" deep. The part is a small steel retainer nut which is difficult to hold because of the size of cut. A 3" dia. slotting cutter mills 350 parts per hour, and approximately 40,000 pieces have been milled without cutter being changed or sharpened. If you need more production, investigate Sundstrand Magnetic Chucks.

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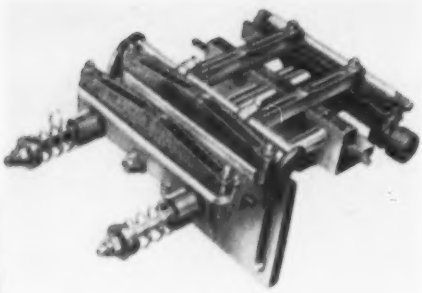
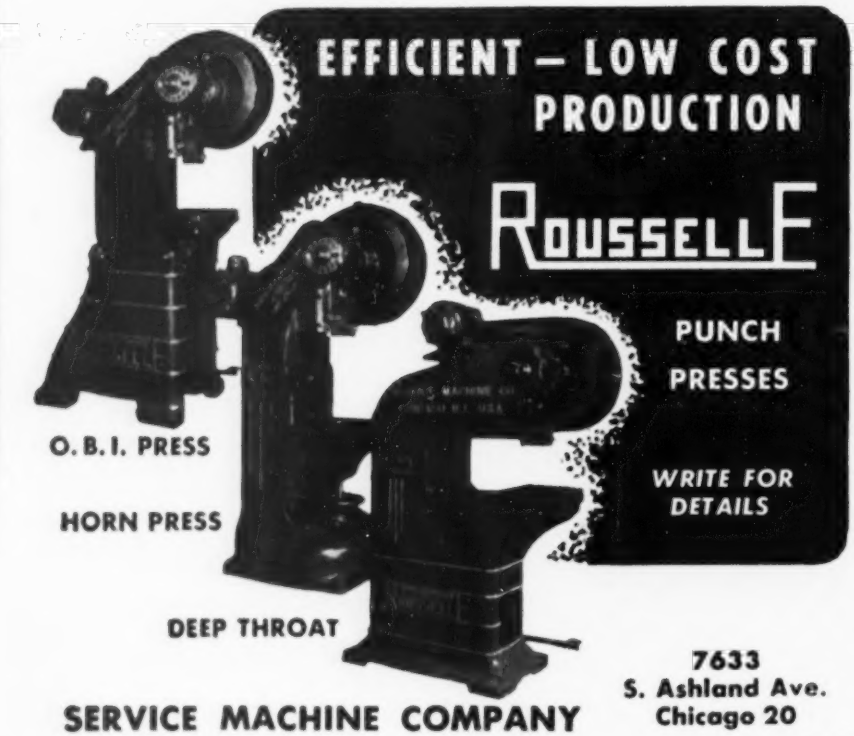


Fig. 7—View of Feedmaster unit, showing feed and hold heads.

working position and then returns for reloading.

Fig. 6 shows a Feedmaster mounted on a press for feeding 8-inch aluminum alloy strip. Its mounting is extremely simple and requires only two socket head cap screws. Fig. 7 shows a view of a Feedmaster unit by itself, including the feed and hold heads. No rolls, gears, or springs are used to provide the feeding motion. The two springs shown are shock-load reducers. The large cylinder at the center provides the horizontal feeding stroke. Parallel guides on each side are adjustable for stock width. The dial with knurled knob on the right is used for adjusting the stroke length



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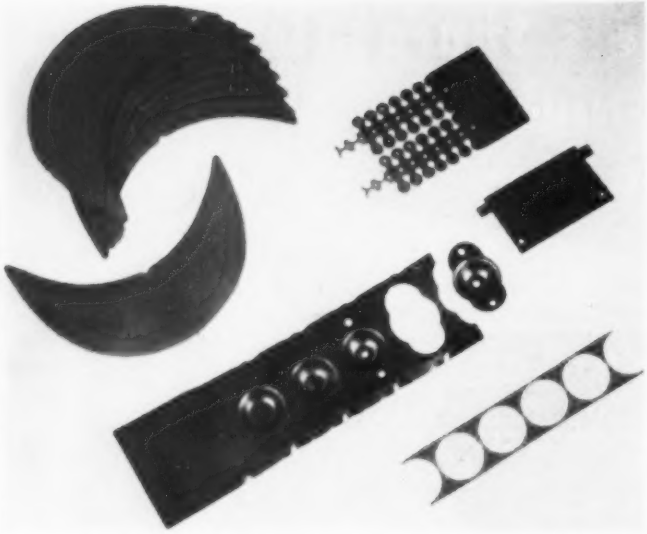


Fig. 8 — Samples of work produced with a Feedmaster unit.

to 0.001 inch; adjustment can be made while the mechanism is in operation.

Only the lower gripper jaw in each head is activated for gripping. Therefore, the upper jaw can be spaced to suit thicknesses of the work strip. Because of this unusual capacity, work as large as 2 x 4 inches was accommodated in one particular milling machine sawing operation. On the other extreme, 0.003-inch thick foil is easily handled simply by respacing the jaws,

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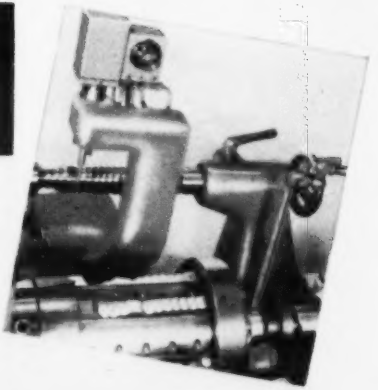
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which can be accomplished by merely loosening two nuts, removing the upper jaws, and inserting new spacers.

A feeding unit of this type is intended for use on punch presses with plain or progressive dies, spot welders, drill presses, milling machines, and so on, in feeding coiled or strip stock of practically any size or shape up to 18 inches wide and with a 12-inch stroke. Fig. 8 illustrates several samples of work produced with the Feedmaster.

Sources of Economic Information for Collective Bargaining (Research Report No. 17). By Ernest Dale. Published by American Management Association, 330 W. 42nd St., New York 18, N. Y. 171 pages. Heavy paper covers. Price, $3.75 (A. M. A. members, $2.50).

This study examines the data now available to negotiators and arbitrators who are seeking a more factual approach to wage setting. It discusses in detail the sources of figures and the nature of the arguments by both management and unions in connection with the four criteria most commonly used in the determination of wage rates; namely, the cost of living, productivity, "going" wage rates, and "ability to pay."

The study is intended not only as a bibliography of sources of wage data but as an analysis of the value and limitations of the various criteria used in wage setting. For this reason, it discusses many of the problems which will undoubtedly arise as government, management, and labor attempt to arrive at an equitable system of wage stabilization.

For further information on any product mentioned in this issue—use the READER SERVICE CARDS between the covers.

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Here you obtain unbiased help on your turning problems, because Gisholt's broader range of equipment includes both manually operated turret lathes and automatic lathes. Gisholt's recommendations are made without prejudice for one type of machine over another.

FASTERMATIC EASES MANPOWER PINCH—MACHINES ELECTRIC MOTOR PARTS AUTOMATICALLY

Multiple Cuts on 6 Surfaces Finish 14" Motor End Bells in 7.5 Minutes

This manufacturer is answering the call for more production . . . with fewer man-hours. And the Fastermatic Automatic Turret Lathe figures prominently in the picture.

The job is machining cast iron end bells for electric motors. Multiple cuts are made on six surfaces to rough and finish the parts complete, ready for assembly. Only 7.5 minutes, floor-to-floor, go into the entire machining operation.

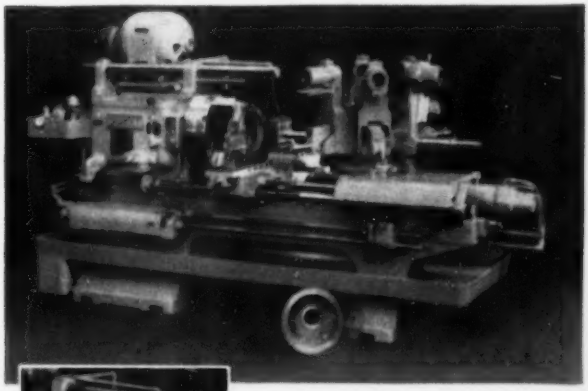
The 14" end bells are held on the O.D. with swivel jaws in a 3-jaw air chuck. Turning the rabbet fit diameter and all internal surfaces, including rough and finish straddle facing, are handled by tools on the hexagon turret. Tools on the independent front and rear slides face the large flange. This completes all machining for a final fit on the stator.

Operator Only Loads, Unloads

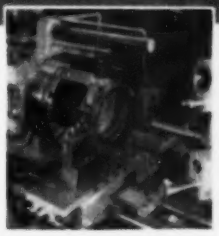
Not once during the entire machining operation does the operator have to touch the machine. His only job is to load and press a button—and 7.5 minutes later remove the completed part. This frees him to operate other machines—for more production, greater output per man and lower costs.

Adaptable to Wide Range of Jobs

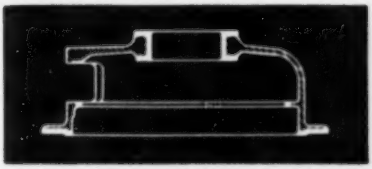
This job, and most jobs that call for a maximum number of surfaces to be machined in a single chucking, is a natural for the Gisholt Fastermatic Automatic Turret Lathe. The six turret faces and two independent cross slides give you a degree of flexibility that's unmatched by any other type of standard machine of comparable size.



The 2FE Fastermatic Automatic Turret Lathe.



Close-up shows new independent front and rear slides of Fastermatic. New T mountings provide faster tool change-overs, wider range of adjustment.



Multiple cuts are made on heavy line surfaces.

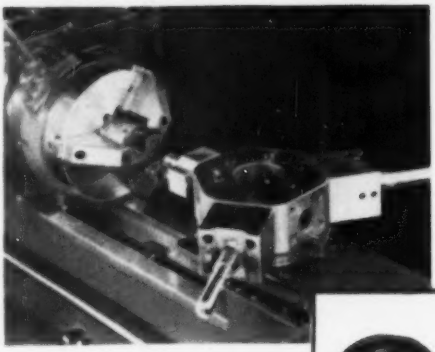
IT BACK-FACING OPERATION ON CLUTCH SLEEVES JOB GETS "FREE RIDE"

Proper Planning Eliminates Extra Operation

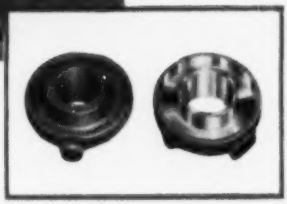
Maybe you can use this smart idea. The job is machining malleable iron clutch release sleeves. Without careful planning, back-facing of the hub could have meant a 2-operation setup.

The job is run on a Gisholt No. 4 Ram Type Turret Lathe. The turret tooling for counterboring, facing, chamfering, recessing, etc., is pretty much conventional for high production output. The smart trick is the way they face and chamfer the back of the hub.

A back-facing fixture is mounted *inside* the spindle. This is operated from an inclined cam on the boring bar. As the turret feeds forward for conventional turning, boring and facing, this cam moves a slide tool to back-face and back-chamfer. These back surfaces require no additional time—thus the "free ride."



Gisholt No. 4 Ram Type Lathe with special back-facing attachment for machining clutch release sleeves (inset).



Floor-to-floor time is 3 minutes.

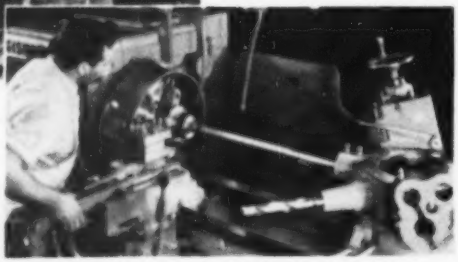
Without this attachment, the work would have to be re-handled. Or, if done in the same chucking, it would be necessary to reach in through the front with a long overhanging hook tool, and therefore suffer from its lack of rigidity and accuracy. Either way, you couldn't equal the swift floor-to-floor time of the back-facing attachment mounted inside the spindle.

Incidentally, the workpiece is held in a Gisholt-Barker Wrenchless Chuck. This permits fast action and leaves the spindle free to hold the back-facing fixture.

1L TURRET LATHE A MASTER AT DEEP-HOLE DRILLING



1st chucking—boring with twist drill.



2nd chucking—finishing bore with gun drill.

Combines Speed with Accuracy

A sturdy machine is a "must" for deep-hole drilling. The Gisholt 1L Saddle Type Turret Lathe is a heavy machine—built for rigidity and accuracy.

Here's one doing this work at the Rockford Machine Tool Company. The part is a 4615 forged spindle for the "16" Rockford Economy Lathe.

The job is drilling a 1 5/8" hole a distance of 25 1/8" with a tolerance of ± .010". Two chuckings are necessary. First the part is drilled for a depth of 9" with a 1 1/2" twist drill. The workpiece is supported by a steady-rest mounted in the square turret on the side carriage. Then the piece is reversed and the remaining 17" is removed with the same drill. Finally, a 1 5/8" gun drill is run the entire length of the bore.

COST CUTTING IDEAS

GISHOLT

SIMPLIMATIC WITH 24 FAST CUTTING TOOLS TURNS OUT TRACK ROLLERS IN 2½ MINUTES

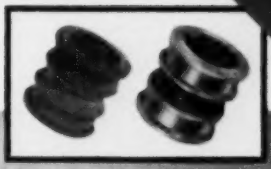
Steel Forging Trimmed of 15 lbs. in Quick, 1-Chucking Job

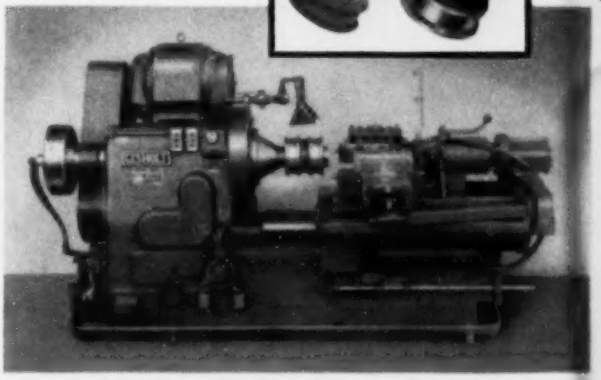
Track rollers are in the news . . . and this Simplimatic job is a real headliner on this type of work.

Twenty-four carbide-tipped tools convert the steel forgings into track rollers in only 2½ min. machining time. For this man-sized cutting, the Simplimatic is called upon for 40 h.p. at peak cutting load. 24 tools, mounted on front and rear slides, perform all turning, shaving, facing and chamfering operations in 1 chucking.

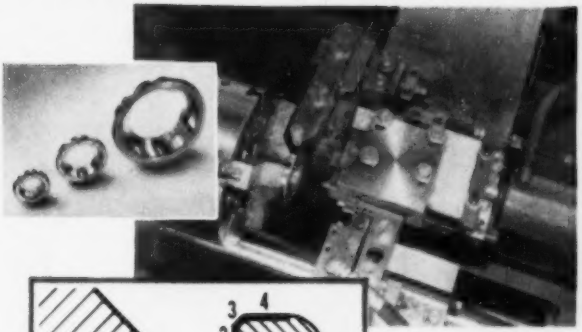
This Gisholt Automatic Lathe handles two different sizes and types of track rollers. It has a 16" air cylinder with push rod for equalizing chuck pressure on expanding chuck fingers.

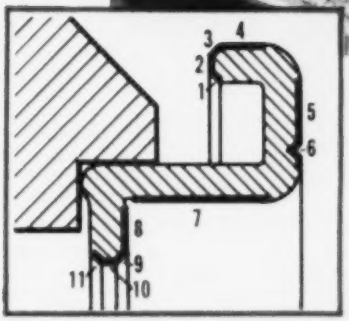
(Below) Simplimatic set up to machine 2 sizes and types of track rollers. *(Right)* Before and after machining views of forged steel track rollers.





11 SURFACES EACH PART...100 PARTS PER HOUR. THAT'S PRODUCTION!





No. 12 Hydraulic Automatic Lathe tooled for machining various size coupling covers (inset).

The heavy lines show the 11 surfaces machined in a half-minute, floor-to-floor.

No. 12 Hydraulic Shows Its Stuff on 3¾" Coupling Housings

Here's a case where production of small coupling housings booms along at 100 per hour. *And*, there are 11 surfaces machined in the brief half-minute floor-to-floor time!

In order to finish all these surfaces, a special auxiliary slide, activated by the rear slide, handles the back facing and chamfering. The same basic tooling handles the full range of sizes from 3¾" to 11".

Free "Equipment Replacement Analysis" Forms!

Take the "hit and miss" out of your machine tool replacement program. Know which machines you can replace most profitably. Gisholt has made up "Equipment Replacement Analysis" forms (as determined by MAPI formula) into clear, easy-to-use 4-page folders. Write for your copies today.

UNDER-PAR EFFICIENCY...*REPLACE NOW!*

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COST CUTTING IDEAS

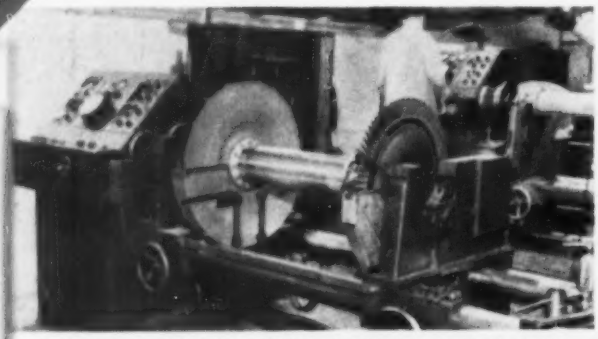
TAKING THE FRETS OUT OF THE JETS

Precision Balancing Makes Faster, Safer Jet Planes Possible

Today's faster-than-sound jets owe much of their terrific speed to precision balancing. Accurate balance is especially vital in the ultra-fast rotating heart of the jet engine—the turbine compressor assembly.

That's why in England, too, Gisholt Dynetric Balancing Machines have the major role of measuring and locating dangerous unbalance in such parts. This Type 3U machine serves in the De Havilland Engine Works, balancing turbine-compressor assemblies. For security reasons, details cannot be revealed, but it is known that without the extreme smoothness of operation made possible by precision balancing, neither this jet engine nor any other could operate at such tremendous speeds.

Precision balancing can make your rotating parts and products better performing, longer lasting. The story of balancing is given in the 36-page booklet, "Gisholt Balancing Machines." Ask for your copy.



Several of the Gisholt Dynetric Balancing Machines in the De Havilland Engine Works. These balance a variety of vital jet engine parts.

DYNETRIC BALANCERS

DRIVE SHAFTS SUPERFINISHED—350 TO 400 PER HOUR

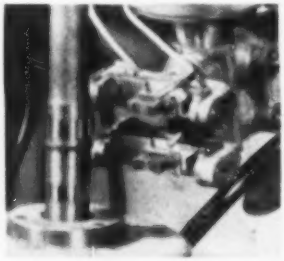
Proves Small Cost of This Important Refinement for Longer Wearing Surfaces

If you think Superfinishing is a luxury, see what it's doing in the cost-conscious automotive industry.

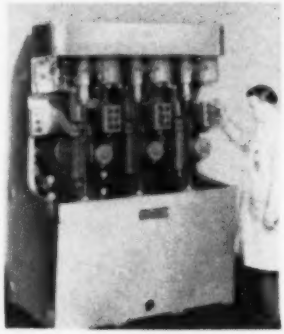
This manufacturer had the usual oil seal problems—until Superfinish solved them. Now, three Model 74 Superfinishers handle all 7 types of rear axle drive shafts.

Each Superfinisher has three stations with individual controls and an automatic cycle. One man keeps all three stations operating simultaneously. All surfaces come to the Superfinishers ground concentrically to an average of 35 micro inches RMS. They leave the machines measuring 8 to 10 micro inches RMS, ready for use. Each of the 3 stations completes a drive shaft in 25 seconds, floor-to-floor time.

Superfinish makes these oil seal surfaces wear longer and stay oil-tight longer. Why not get acquainted with this highly effective, low-cost production step? Write for your copy of "Wear and Surface Finish." No charge, of course.



Close-up of rear axle shaft with two oil seal surfaces. Superfinishing stones are in retracted position. Three stations like this are on each machine.



This three-station Superfinisher turns out 350 to 400 Superfinished axles per hour.

No. 451
56BA

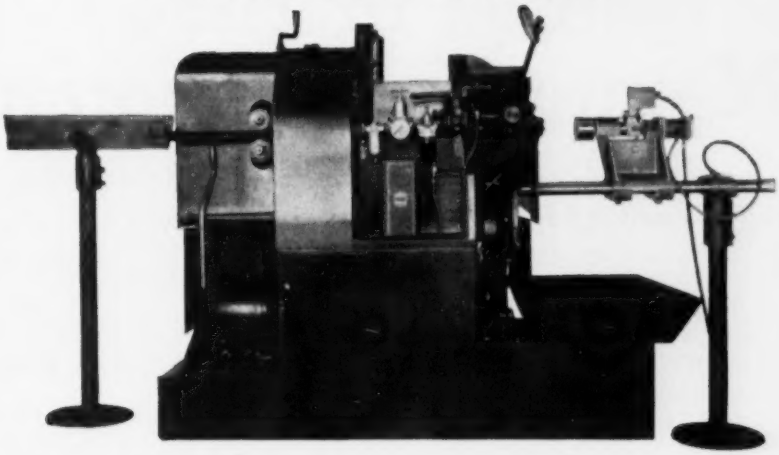
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A general catalog on machines listed below is available on request.

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This machine cuts off and chamfers both outside edges of ⅛" .030 wall tubing, 5" long at the rate of one every 2.5 seconds.

1¼" Cold Rolled

This machine cuts off and chamfers both ends of 1¼" cold rolled, 20" long, at the rate of one every 20 seconds.

1" Tubing

This machine cuts off and chamfers both outside edges of 3" long, at the rate of one every 3 seconds.

These popular, time saving machines are now available in two sizes, handling work up to 3" O.D. Their many cost cutting features are described and illustrated in our latest catalog that will be mailed promptly on request.

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Jackson, Michigan

Conference Advocates "Stitch in Time" Maintenance Program

In which the author reports on the highlights of the second Plant Maintenance Conference.

By H. H. Slawson

AT the second Plant Maintenance Conference, held in Cleveland early this year and attended by some 12,000 plant executives, many definitions of "maintenance" were offered but they all boiled down to the familiar age-old adage, "A stitch in time saves nine." Discussions brought out, also, that plant maintenance is too often taken for granted. On the other hand, H. E. Shaw, divisional industrial engineer, factory service division, Westinghouse Electric Corporation, asserted that maintenance is one of the most important functions of plant management.

Mr. Shaw stated, "Unless machines are kept in repair so that production is uninterrupted; unless buildings are maintained; and heat, light, water, air, and so on, supplied, production will stop. He then added, "There is no substitute for maintenance. Either the services are supplied, machines repaired, buildings maintained, or we go out of business."

R. S. Williams, plant engineer, De Laval Steam Turbine Company, put the problem on a dollars and cents basis. "Maintenance," he said, "costs the country's industries over $8 billions a year."

"What is this maintenance?" Mr. Williams asked. "Maintenance in the metal working industries is the same as in all industries. It is to hold or keep in any particular state. The difference between that definition of maintenance and actual maintenance is eight billion dollars. That's a whale of a difference."

"There is great need," Mr. Williams declared, "for development of a formula which will break down costs and determine what portion of overhead can justifiably be charged to maintenance." Pointing out the delicate distinctions affecting allocation of costs, he said, as an example, that snow removal, leaf raking and grass cutting should properly be considered as maintenance functions, while removal of garbage from shop containers is in a class with operating services, such as providing compressed air, steam, water or electricity and should not be charged to maintenance.

This emphasized the need for a



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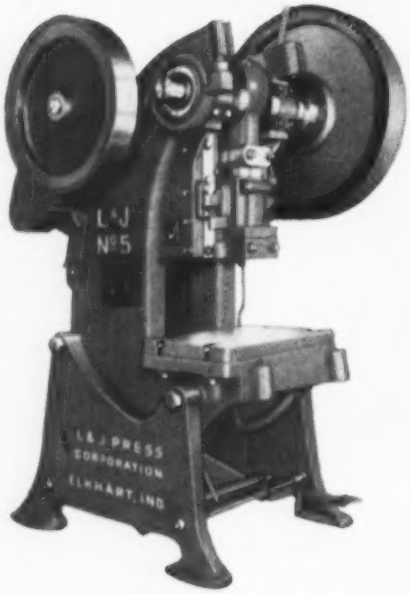
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standard formula, with which, he said, all industries could determine how to charge out of maintenance expenses that portion of labor and overhead which is not maintenance. The result would be to bring maintenance costs into sharp focus in terms of sales dollars. And it would also "make us scratch for new materials and new methods, so that our maintenance dollar will go farther."

"Maintenance is a necessary business function and is, therefore, a part of any manufacturing operation, large or small," declared M. A. Travis, plant engineer, Nash Motors Body Div., Nash-Kelvinator Corp., Milwaukee, Wis.

"On the ledger," he went on, "maintenance appears as overhead. But the effects of a good or a poor maintenance program are a big factor in the ultimate profits of any operation, large or small. Management must realize the importance of maintenance to production output, as the first step in the installation of the proper maintenance program for your own particular plant. The conclusion to be drawn is that maintenance is a normal function of business and should be considered as such."

"In a large plant, where investments are great and business is based on production," Mr. Travis continued, "Production losses are expensive and the importance of systematic maintenance is very evident to management."

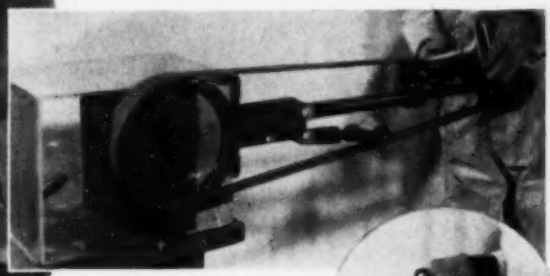
"Unfortunately, in some small plants," he continued, "the effect of poor maintenance is not so rapidly pointed to their effects. Production losses, due to that lack of good maintenance affect the earnings of the small plant and the cost of preventive maintenance can be justified by reducing their losses. This, of course, is the

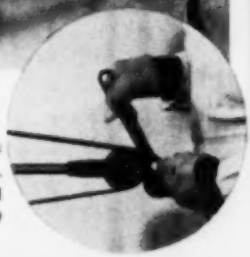
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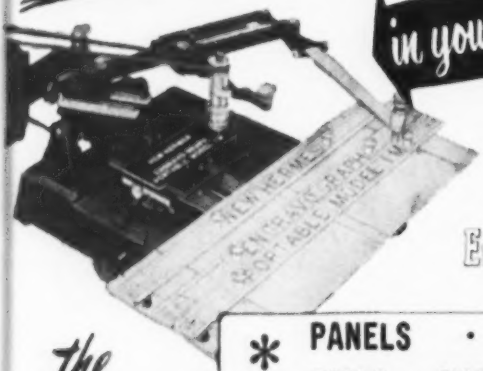
simplest common business sense, but the realization of this fact by the management of the small plant is necessary to the success of maintenance business."

"The maintenance problem," he repeated for emphasis, "has a direct effect on plant production and in turn on net sales of the product. The condition of plant equipment in fact is a dominant factor in six directions: (1) product quality control; (2) product manufacturing cost; (3) production rates; (4) production control; (5) plant safety; (6) industrial relations." "Or, in brief," he summed up, "the profitable operation of the business."

"A preventive maintenance program," he further declared," is justified on five grounds. It (1) forestalls breakdowns that result in lost production and costly repairs; (2) increases the life of the equipment maintained; (3) keeps equipment in efficient and accurate operation—remembering the famous horseshoe nail; (4) controls small parts inventory; and (5) increases maintenance manpower efficiency."

Maintenance is caused by many things other than normal wear of parts, it was pointed out by F. A. French, chief plant engineer of the John A. Roebling's Sons Company, Trenton, New Jersey. "It may result," he said, "from such causes as faulty design, defective materials, carelessness, accident, overloading, faulty lubrication or even willful acts by em-

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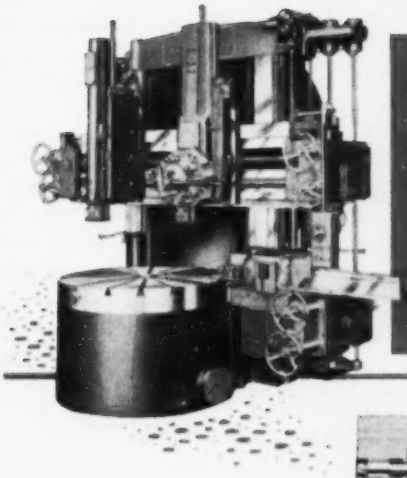
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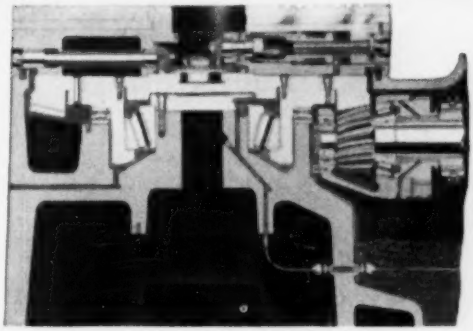
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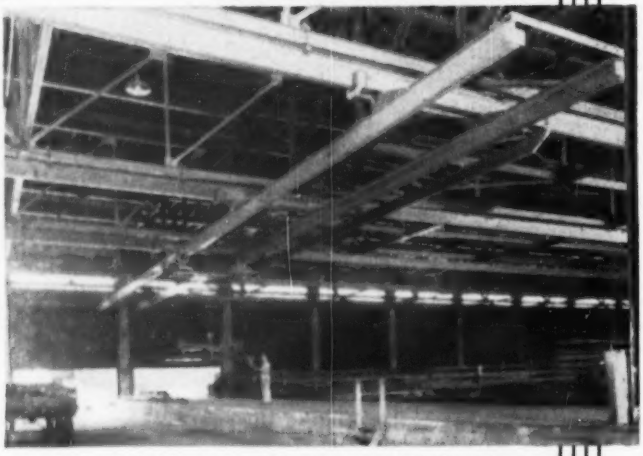
ployees." While it is thus difficult to call all the shots, when it comes to plant maintenance, formal planning and control of plant maintenance would help, he suggested. Yet, even so, there would still be need for "almost inevitable resort to compromise as dictated by urgency and expediency," since management policies frequently affect the maintenance program of the plant.

"Most of us," said Mr. French, "have probably had the experience of wanting to move in and institute needed repairs to idle equipment during slack periods, only to find that management prefers to make such repairs when there are profits. Most of us, too, are bright enough to know that there are circumstances and viewpoints under which just such a decision can be sound. There are, however, companies which set up adequate reserves for conducting maintenance work during slack periods. But there, again, while this plan sounds good to the plant engineer, it is not always the best plan from the accountant's point of view."

"My experience has been that I find myself and those in my department making so many compromises so often that the most important consideration becomes one of building the maintenance and engineering department strong in technical brains, experience, know-how and judgment."

Records and reports have a highly important part and pay off well in

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Industrial Double Girder Multiple Runway Cranes provide high hook lifts and long spans at lower cost.

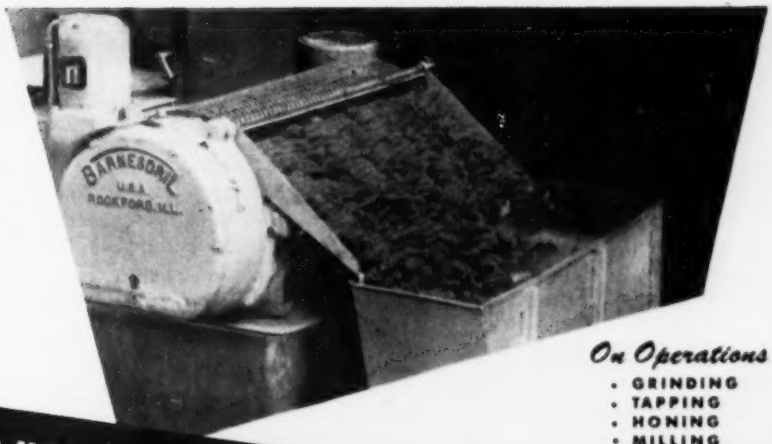


Illustration shows 5 runway, 3 motor close headroom type—110 ft. span.

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COMPANY.....

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CITY..... ZONE..... STATE.....

a successful preventive maintenance program, declared Wm. A. Perry, assistant general superintendent of service, Inland Steel Co., East Chicago, Ind.

"Bearings," he pointed out, "are an important item in any maintenance program. To keep them in proper condition periodic inspections are essential and records and reports on bearings are necessary to show which bearings give the longest and most trouble-free service." "One record, kept by Inland Steel," he stated, "has revealed that one type of bearing is still in service after 6,400,000 tons of steel were rolled."

Shear knives, like bearings, need frequent inspection and the records on this tool, he explained, determine when the knives should be ground, also which knives give the best service.

"Only through these records," he said, "can the facts be verified and used as a basis for definite conclusions as to what performs the job best and what should be done to improve performance."

"These routine records," Mr. Perry continued, "are also useful for more conclusive studies comparing the performance of different makes of equipment, such as tractors, batteries or gears. Such records are compiled and presented so that they clearly indicate how the performance of the units compare and vary over the years. Such information is also useful to the manufacturer, for they indicate how he





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can redesign or otherwise modify his product to better satisfy the customer's needs."

Mr. Perry exhibited one record which had revealed numerous delays caused by broken keeper bolts. "To remedy this," he said, "keeper bolts were made of alloy steel and the diameter increased, with complete elimination of the previous difficulty."

Another record covering the performance of motors, shows that one motor which had been in service 45 days, had frequent bearing failures and occasional rubbing of the armature and pole piece, which required extensive and expensive repairs.

"These records thus substantiated the fact that some improvement was definitely needed," he said. "As a result, roller bearings with a babbitt backing were designed and made as a substitute for the original sleeve bearing, which eliminated these costly failures."

"Based on routine inspection and reports," he went on, "a varnish schedule was set up for all electrical main drive units and their immediate auxiliaries, failure of which could result in lengthy and costly delay of some major drive." "Intervals between varnishing," he said, "vary considerably for different units, but average about once every three years." Indicative of profitable results obtained, he cited one 2,000 h.p. induction motor used as a main drive unit in the plate mill. This motor, he stated,

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Write for Bulletin 16-D

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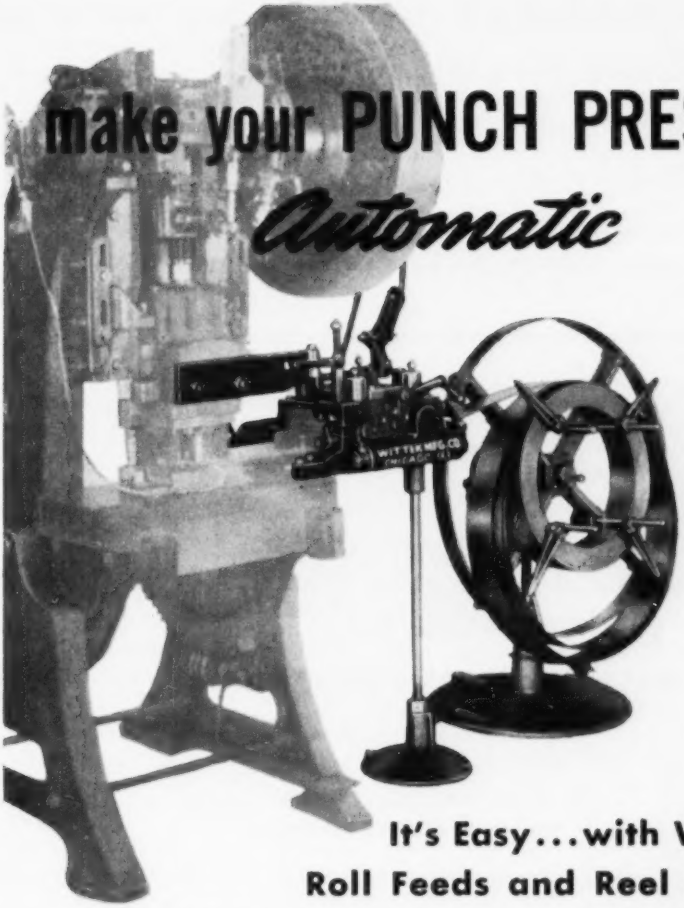
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It's Easy...with WITTEK Roll Feeds and Reel Stands

Wittek Roll Feeds handle any type of coiled strip stock and are made in single roll, double roll, and compound types with straighteners, in models to feed in any of four directions. They are reliable and accurate with simple, quick adjustment of feed length. Standard sizes and models meet a wide variety of press size and capacity conditions.

Wittek Reel Stands facilitate handling coiled stock.

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Automatic ROLL FEEDS AND REEL STANDS WMCo

is still operating satisfactorily after 38 years of service.

Still another impressive instance of the money value of "stitch in time" preventive maintenance was related by D. F. Hollingsworth, lubrication consultant for E. I. du Pont de Nemours & Co., Wilmington, Dela., who discussed "Applied Lubrication in Industry."

"Trouble shooting can really test the skill of the lubrication engineer," said Mr. Hollingsworth. "In one plant, for example, an attempt was made to increase the speed of certain machines about 20 per cent to get more output. Trouble developed in the form of rapid failure of oil-immersed gears. Making a comprehensive analysis, the engineers traced the cause to 'hunting' of the drive motor and this, in turn, to the turbine governor in the power house. Changes made to the governor stopped the rapid failure of gears and allowed the machine to run at higher speed, without excessive maintenance costs. Ability to run the machine at the higher speed eliminated the need for a large plant expansion."

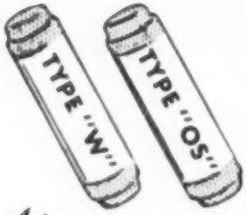
"The lubrication engineer," Mr. Hollingsworth said, "must establish routines for scheduled lubrication of each machine and make sure that nothing is overlooked. In one plant which has some 2,750 machines, it required more than 1,500,000 inspections a year to lubricate everything. But, after inaugurating a lubrication schedule the



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HYPREZ DIAMOND COMPOUNDS



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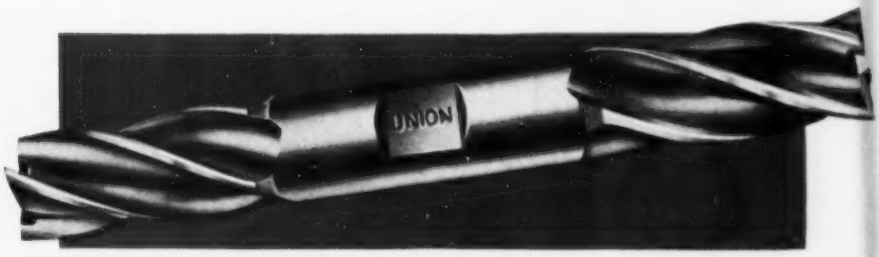


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ENGIS EQUIPMENT CO.
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You cut costs as well as metal...

with UNION *end mills*

UNION DOUBLE-END END MILLS are available with four flutes — as illustrated — or two flutes, in standard or small-diameter sizes. All in high speed steel.

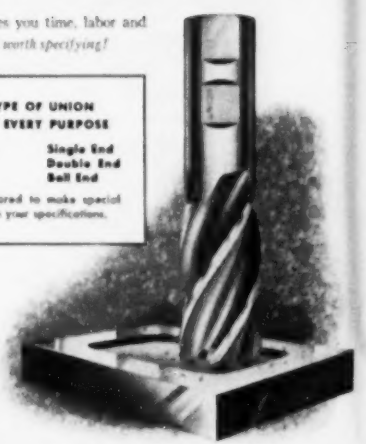


BUILT FOR MAXIMUM ECONOMY, Union end mills provide top performance throughout the range of end milling operations. Made of high speed steel, they have the smooth, free-cutting action that saves power, while their great strength reduces breakage to a new low. And all Union solid type end mills of ½" diameter or over have deep counterbores, considerably lengthening their resharpening life. In fact, as with all Union cutting tools, every detail of their design and construction is the result of up-to-the-minute tool engineering that saves you time, labor and money . . . *And that's worth specifying!*

THERE'S A TYPE OF UNION END MILL FOR EVERY PURPOSE

Taper Shank	**Single End**
Straight Shank	**Double End**
Shell	**Ball End**

Union is also prepared to make special types of end mills to your specifications.



no other end mill will outperform a UNION

contact your local distributor

His name is listed in Union's THOMAS' REGISTER insert under "Drills, Twist."

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Milling Cutters · Gear Cutters · Twist Drills · Hobs · Reamers · Carbide Tools

We own and operate S. W. CARD MANUFACTURING CO. Division, Mansfield, Mass. Taps, Dies, Screw Plates . . . BUTTERFIELD DIVISION, Derby Line, Vt., Taps, Dies, Screw Plates, Reamers . . . BUTTERFIELD DIVISION, Rock Island, Que., Milling Cutters, Twist Drills, Hobs, Reamers, Taps, Dies, Screw Plates.

number of inspections was cut to 1,200,000, a drop of about 20 per cent. This saved several thousand dollars in application costs and, in addition, curtailed the number of equipment failures."

"One of the worst things about poor lubrication," Mr. Hollingsworth declared, "is that it creates hazards in the plant." Suggestive of how lubricating engineers can eliminate unsafe working conditions and also effect operating savings, he told how open bevel gears were throwing lubricant to the aisle, where it created slippery footing for the operators.

"Development of a new and more adhesive lubricant," he said, "solved this problem, eliminated the safety hazard and also effected considerable savings."

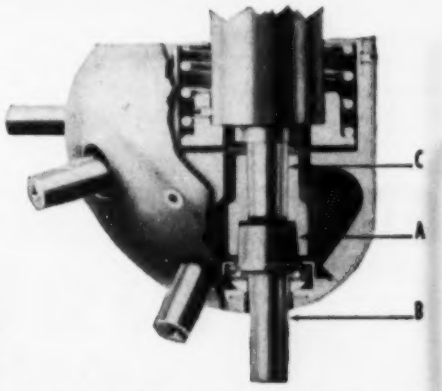
The Aluminum Company of America was at one time using approximately 850 different types and kinds of lubricating materials, but is now using only about 150, the Cleveland conference learned from L. B. Sargent, Jr., assistant chief of Alcoa's lubricants division. "It has been conclusively shown," he said, "that far-reaching consolidation of numbers of lubricants used can be made without harming machine efficiency or maintenance and with decided advantages accruing."

"For one thing," he pointed out, "fewer lubricants make possible better insight into their performance with good possibility of showing and decreasing hidden repair and maintenance costs." Other advantages, as he listed them, include such important factors as de-



MORE HOLES
PER HOUR — PER DOLLAR

Increase production of any standard drilling machine by adding a Lign-o-matic, the *only* drill turret with the patented, self-centering principle that guarantees sustained accuracy equal to the drilling machine itself.



FOR ALL CONSECUTIVE DRILL PRESS OPERATIONS

PROVED PRODUCTION INCREASE — Turret indexes faster than tools can be changed or work moved to another spindle. A single Lign-o-matic will release 5 drilling machines for other work and still show increased production and reduced costs on original job.

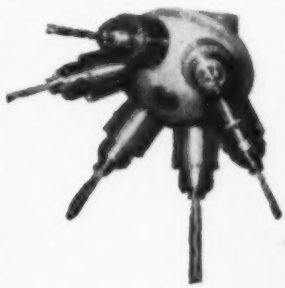
VERSATILITY — Fits any standard drilling machine without altering the machine. Handles operations such as drilling, reaming, counterboring, and tapping (on reversible spindle machines), up to ½" diameter in any material.

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GUARANTEE — May be returned in 10 days *for any reason* for full refund of purchase price. Two-year guarantee against defective parts.

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(drill press make)..... (size).....
(quill dia.)..... (spindle taper).....
My name.....
Title .....
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(Attach coupon to company letterhead)

HOWE & FANT, INC.
527 FLAXHILL RD., SO. NORWALK, CONN.

creased inventories and storage space; decreased initial cost and paper work; and decreased possibility of lubricant mixup. Fewer lubricants also increase flexibility on the part of the purchasing agent and offer the possibility of contract buying, he asserted.

Ted P. Witt, division maintenance engineer, Tennessee Eastman Corp., Kingsport, Tenn., related how a lubrication committee was set up, consisting of maintenance men from all plant divisions, with representation from the purchasing and engineering departments and with the plant lubrication engineer as chairman. "A survey, he said, "revealed that 57 different lubricants were being carried in stock, but, through the committee's work, this number was brought down to eight oils and three greases." "At the meetings, once each quarter," he said, "information and experience on lubrication problems encountered in all parts of the plant are exchanged with great benefit derived all around."

A helpful suggestion on one method of heading off maintenance trouble and expense was offered by B. M. Werly, of the Eastman Kodak Co., Rochester, N. Y., who related how, when newly purchased equipment is received, it is checked for damage that may have occurred in transit, such as broken castings, weather damage, or dirt in working parts.

The new equipment is also checked against specifications for materials used

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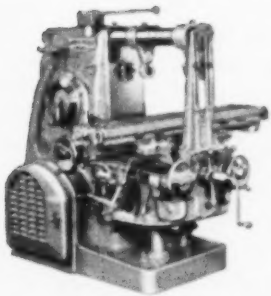
GREATER MACHINE LIFE



Kearney & Trecker's new CK milling machines are built to give you the maximum in Greater Machine Life. Generously proportioned gears and shafts, plus automatic, positive lubrication easily meet overload conditions. Every component provides the rigidity and resistance to wear that the greater horsepower and heavier cutting loads of modern milling methods require. For fullest protection, column and knee are forced flood lubricated. A positive, metered pressure system takes care of table, saddle and knee ways and table feed assembly.

A new line of knee-type milling machines

KEARNEY & TRECKER MILWAUKEE **CK's**



New Model CK
10 hp No. 2 Plain Style
Milling Machine

YES, Kearney & Trecker's new CK milling machines are packed with design and operating features that make them *more productive, more profitable for you.*

Spindle-mounted flywheel, broad feed and speed ranges and greater horsepower with separate motor drives for spindle, and feed and rapid traverse, mean you get fullest possible benefit from modern cutting tools.

New CK columns give you greater rigidity. Compared to former columns, they give you 1000 pounds more metal in heavier ribbing, in box-type, sponson construction to absorb vibration from heaviest cutting loads.

For greater production, these machines are equipped with Kearney & Trecker's famous Mono-Level Control that shortens floor-to-floor time, and materially reduces operator fatigue. New, non-glare micrometer dials help avoid costly errors in reading . . . give you a positive lock at every setting.

Automatic flood lubrication in column and knee and positive metered lubrication to table and saddle, plus generously proportioned gears and shafts assure you greater machine life.

Find out for yourself about Kearney & Trecker's new CK line of knee type milling machines . . . how they meet every demand of modern milling practice . . . how they can give you greater production at greater profit.

Sizes are No. 2, 3, 4, 5, and 6 . . . Plain and Universal styles. For complete details, contact your nearest representative or write direct. Kearney & Trecker Corp., 6784 W. National Ave., Milwaukee 14, Wisconsin.

REPLACEMENT OF OBSOLETE MACHINE TOOLS
IS AN INVESTMENT THAT MAKES BOTH DOLLARS AND SENSE

KEARNEY & TRECKER MILWAUKEE MACHINE TOOLS

and dimensions called for on the drawings, as well as to locate any mechanical or physical defects.

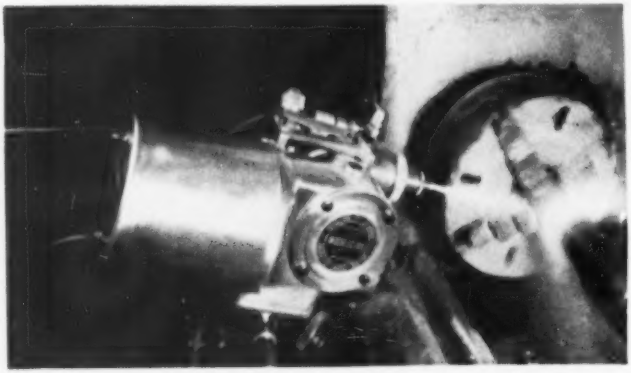
Electrical men, safety directors and others also make checks and necessary steps are taken to correct any faults turned up. "This procedure," he said, "will greatly reduce the cost of placing the equipment in service."

Once, however, there was a slip-up, he admitted. Some air conditioners had been delivered, but due to pressure to meet a tight construction schedule they were not checked for leaks. After being connected, these leaks were discovered and to repair the trouble it was necessary to remove the insulation and partially dismantle the air conditioners.

There was much more to the Cleveland plant maintenance conference than this brief review might imply. Other topics on the program covered such matters as maintenance of power plant and heating equipment, the upkeep of floors, painting and decorating, the maintenance of proper sanitation facilities and many others.

Repeatedly during the course of the conference the need was emphasized for preventive maintenance in small plants as well as in large ones. "For the smaller plant," said one speaker, "there are too many production delays, too high production costs, too low quality and too low morale."

"Management may not recognize that its maintenance program is a basic cause of these conditions," said this speaker, W. C. Zinck, plant manager, Arbogast & Bastian, Inc., Al-



Rebuild Worn Parts by *Metallizing*

Save time, money and critical parts by Metallizing with new Mogulectric Gun. Adds metal to metal with fine atomization for perfect bond. Simplified, easy to use, engineered to give trouble-free service.

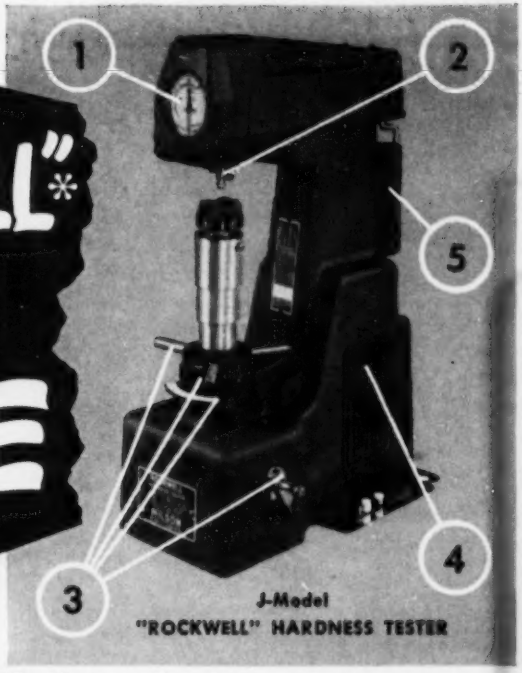
Also ideal for spraying corrosion-resistant metal coatings and for production work.

If you already have metallizing equipment, why not consider a trade-in now for the new Mogulectric Gun.

Write for new booklet containing complete information on equipment as well as production and maintenance applications.

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J-Model
"ROCKWELL" HARDNESS TESTER

You NEED these features to assure accuracy and speed in hardness testing

1. Totally enclosed, dirt and dust-proof "Zerominder" dial gauge
2. Gripsel clamp screw for quick change and proper seating of penetrator
3. All controls grouped conveniently under capstan handwheel
4. Enclosed, easy-to-reach variable speed dash pot
5. Standardized weights

The J-Model improved "ROCKWELL" *Hardness Testers have higher sensitivity, increased speed, and are simpler to operate.*

Most specifications today call for parts with certain hardness limits. If you test incoming materials, you know if they meet your production requirements. You know there will be fewer rejects.

"ROCKWELL" Hardness Testers are made in two types (Regular and Superficial) and many styles with accessories so they can be adapted to testing flats, rods, rounds, and odd shapes. There is also the TUKON for micro-indentation hardness testing. Tell us the nature of the test you contemplate, and we will recommend the machine best suited to the work.

**Trade Mark Registered*

ACCO

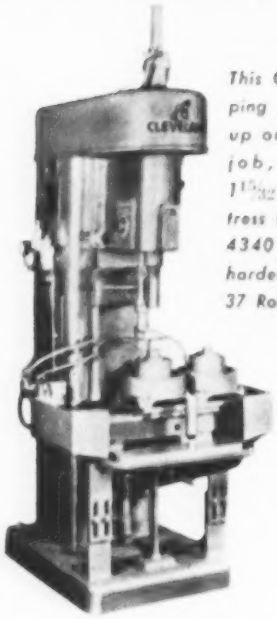
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AMERICAN CHAIN & CABLE

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CLEVELAND TAPPERS

Cut Tapping Costs



This Cleveland Tapping Machine is set up on a munitions job, tapping a 1 15/32", 16-pitch Buttress thread in SAE 4340 steel tubing hardened to 35 to 37 Rockwell.

On Tapping, Threading, Drilling, Spotfacing, Reaming, and Chamfering operations, the chances are that CLEVELAND engineers can save you money and valuable working time by designing a CLEVELAND Tapping Machine which will not only combine several operations but also tap groups of holes at one stroke of the machine. *Check with CLEVELAND first.*

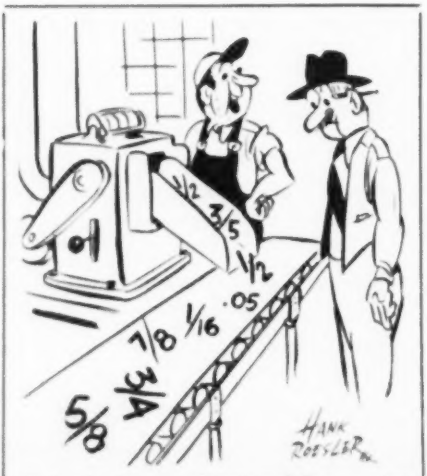
If you would like recommendations on a machine, submit prints, specifications, and sample parts. Write for your copy of the CLEVELAND Production Tapping Guide No. W-4.

THE CLEVELAND TAPPING MACHINE CO.
A Subsidiary of AUTOMATIC STEEL PRODUCTS, INC.
CANTON 6, OHIO

lentown, Pa. "Or it may realize that fact but does nothing permanently constructive about it, because they feel they are 'not big enough to afford it.' A small plant, however, can well afford a maintenance program developed through purposeful thought to meet its specific needs."

It remained for Eastman Kodak Company's Mr. Werly to put the capstone on the Cleveland story. "We feel," he said, "that preventive maintenance is a must for present industry, from the standpoint of economy, safety and uninterrupted work of the employee. Intelligent preventive maintenance certainly reduces production loss from unnecessary shut downs, as well as reducing cost of repairs, by catching them when they are minor, rather than waiting until they become major."

Joint sponsors of the Cleveland plant maintenance conference were the American Society of Mechanical Engineers and the Society for the Advancement of Management.



"I hooked up a fractional h.p. motor to it,—just to see what would happen."

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•MAGNETIC BITS

"PAID OFF" IN ONE WEEK



THIS manufacturer of metal cabinets found a lot of time was being taken to insert and drive screws in locking bars with hand screw drivers. Some screws were loose, others so tight that bars buckled, others were difficult to reach.

The Rotor Application Engineer suggested Rotor Midget Screw Drivers that have double-cushioned clutch (for torque control) and magnetic bits (to hold screws in while inserting in the hard to reach places.)

Results? Over 40 man-hours saved per week. The labor savings *alone* "paid off" the tool costs in the unusual time of *one week.*

Want to study *your* methods for similar benefits?

Call in the Rotor Tool Application Engineer or write for Catalog #35.

AIR O'TOOL

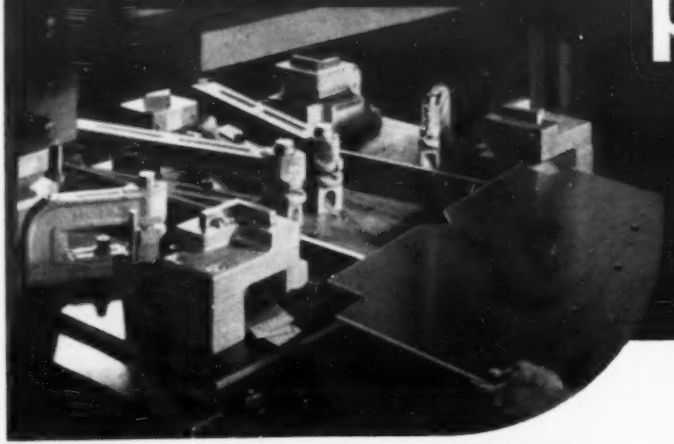
AIR

THE ROTOR TOOL CO.

CLEVELAND OHIO

HIGH CYCLE

How WALES UNITS punch and notch simpler and quicker

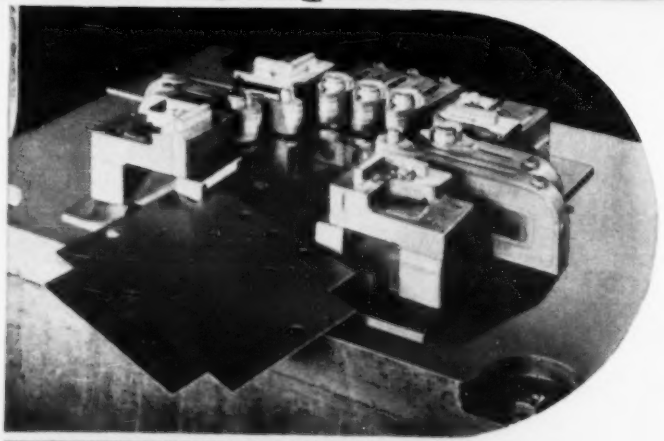


A template set-up of Wales Type "BL" Hole Punching Units and Type "N" Notching Units in a stamping press for punching and notching in the same operation as shown in the work in foreground.

Another typical set-up of Wales Hole Punching and Notching Units mounted on the template outside the press and slid onto the press bed ready to operate with the first stroke of the press ram.

● Setting up Wales Units is a simple assembly operation outside the stamping press or press brake. This fast, time-saving feature permits set-ups to be moved onto the press bed and start production with the first down stroke of the press ram.

With punch and die held in perfect alignment by a holder, this independent, self-contained design eliminates the usual time consuming, *individual* adjustments required to align conventional dies. Nothing is attached to the press ram.



Each Wales Unit is independently mounted which provides quick set-ups for various hole punching patterns. Such set-up flexibility keeps this tooling investment in practically continuous productive operation.

A GOOD RULE — Check with Wales-Strippit before punching or notching angles, channels, extrusions or sheets by any method.

WALES-STRIPPIT CORPORATION

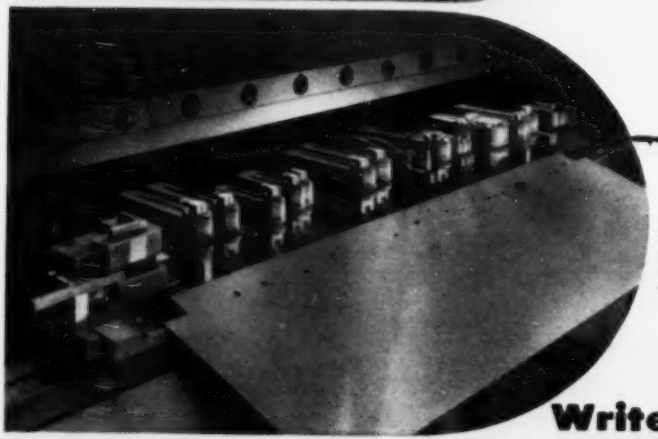
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398 PAYNE AVE., NORTH TONAWANDA, N. Y.

(Between Buffalo and Niagara Falls)

WALES-STRIPPIT OF CANADA, LTD., HAMILTON, ONTARIO

Specialists in Punching and Notching Equipment

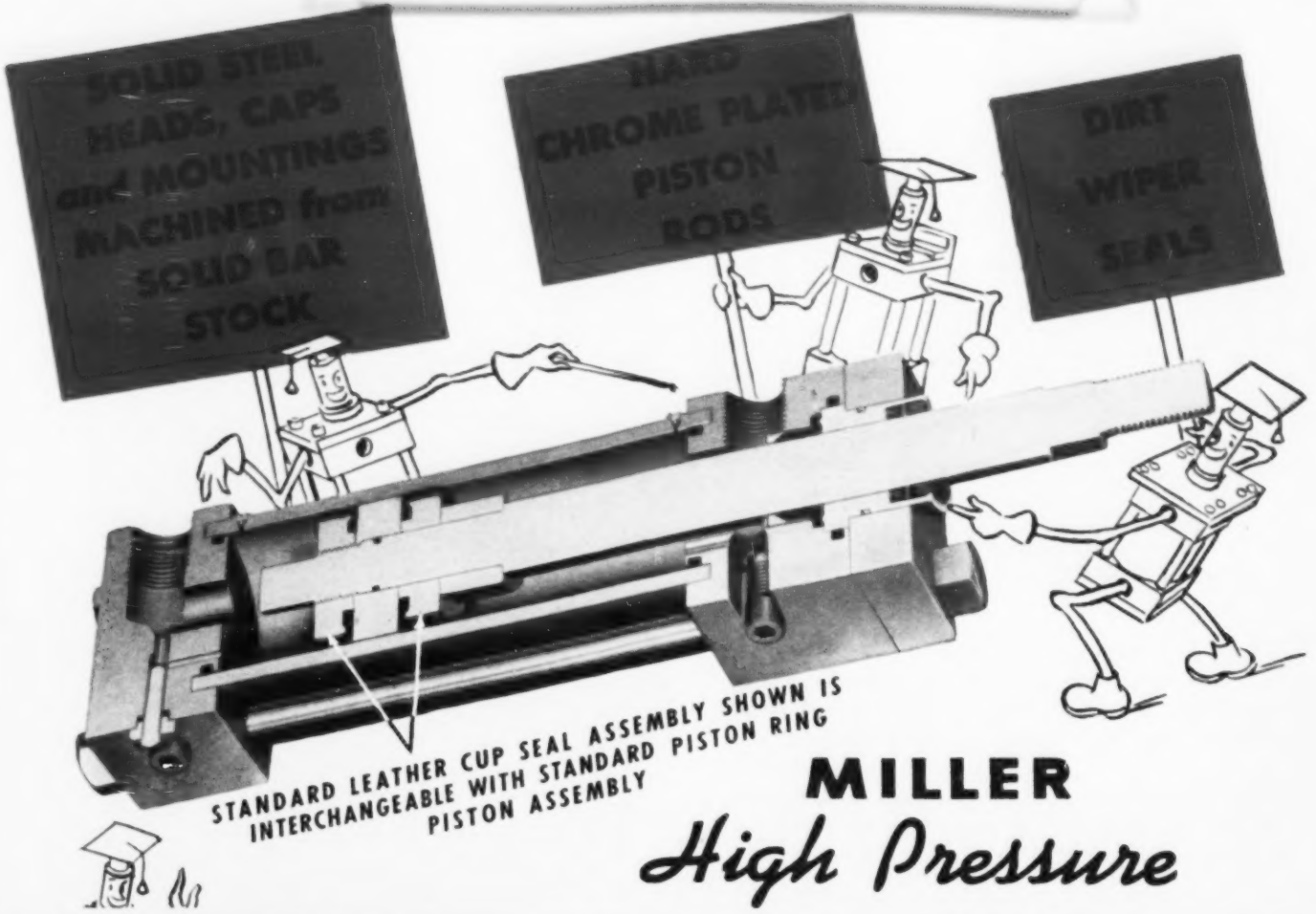


Illustrating a combination set-up of Wales Notching and Hole Punching Units on a press brake set-up. Note that straight line or staggered hole patterns may be punched with Wales Hole Punching Units.

The multiple savings in time and investment with Wales Equipment is too BIG a story to tell in this space, so write for fully-illustrated, functional-colored Catalog BL and Catalog N.



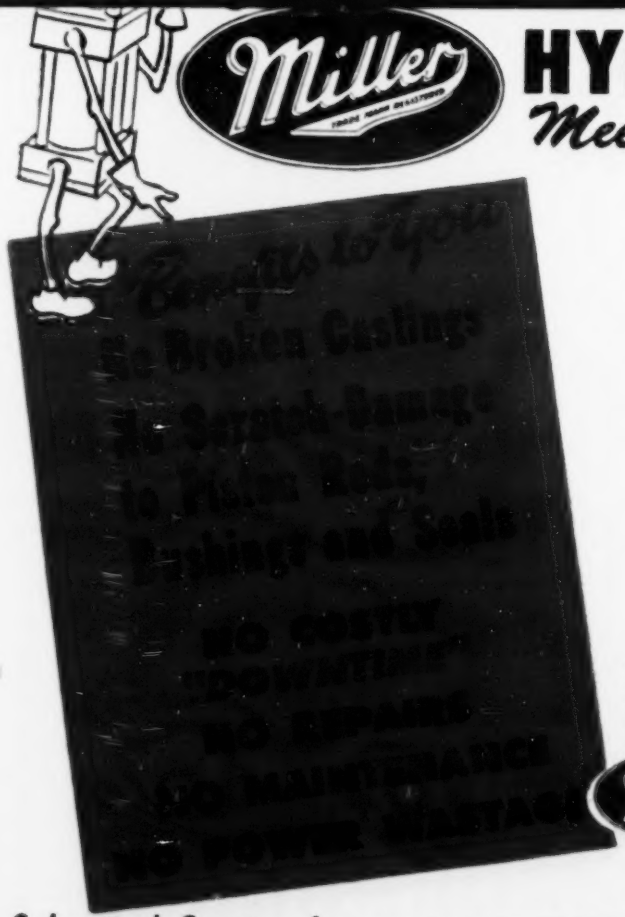
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STANDARD LEATHER CUP SEAL ASSEMBLY SHOWN IS INTERCHANGEABLE WITH STANDARD PISTON RING PISTON ASSEMBLY

MILLER

High Pressure



HYDRAULIC CYLINDERS
Meet J. I. C. HYDRAULIC STANDARDS

(Write for FREE Copy of these "Standards")

Years before the Joint Industry Conference (J. I. C.) Standards for specifying "quality" hydraulic equipment were adopted, the *standard* design and construction features of Miller High Pressure Hydraulic (2000-3500 psi) Cylinders already included ALL the specifications for cylinders, seals and pistons now called for by the "Standards". Hard chrome plated, scratch-resistant piston rods and dirt wipers have long been standard Miller cylinder features yet are required by the "Standards" only under severe conditions.

Solid steel heads, caps and mountings which eliminate costly, dangerous breakage even under the severest operating conditions represent an "extra-quality" standard Miller cylinder feature which actually exceeds the high quality set by the J. I. C. Standards.

The Miller "Patented" Hydraulic Piston Rod Seal which has no manual adjustment and is automatically self-adjusting and wear-compensating to give life-long leakproof service without ever requiring any manual adjustment whatsoever . . . far surpasses the requirement of J. I. C. Standard H6.2.5 which specifies "Stuffing boxes for automatic packing shall be so designed as to prevent adjustment beyond the functional limits of the packing"

Write for illustrated cylinder bulletins A-105 and H-104

COMPLETE MILLER CYLINDER LINE INCLUDES: AIR CYLINDERS, 1½" to 20" BORES, 200 PSI OPERATION; LOW PRESSURE HYDRAULIC CYLINDERS, 1½" TO 6" BORES FOR 500 PSI OPERATION, 8" TO 14" BORES FOR 250 PSI; HIGH PRESSURE HYDRAULIC CYLINDERS, 1½" TO 12" BORES, 2000-3000 PSI OPERATION. ALL MOUNTING STYLES AVAILABLE.

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Isotopes At Work

In which the author reviews some of the more interesting present-day industrial applications.

By Frank Charity

DESPITE an aura of fear and mystery, which has shrouded atomic energy developments since the closing days of World War II, an impressive number of practical applications have been found for by-products of the now-vast A-bomb project.

Such applications are of particular industrial importance, because the subject by-products or "isotopes" can be obtained for a remarkably low cost and may be used for a variety of unprecedented production operations.

Isotopes in general have been known to physicists and chemists for many years as any of a group of elements having identical chemical and spectroscopic properties, yet different atomic weights. In the atoms comprising a heavy metal, such as pure iron, many isotopes can sometimes be detected—even though the material itself may constitute nothing more than a single chemical element.

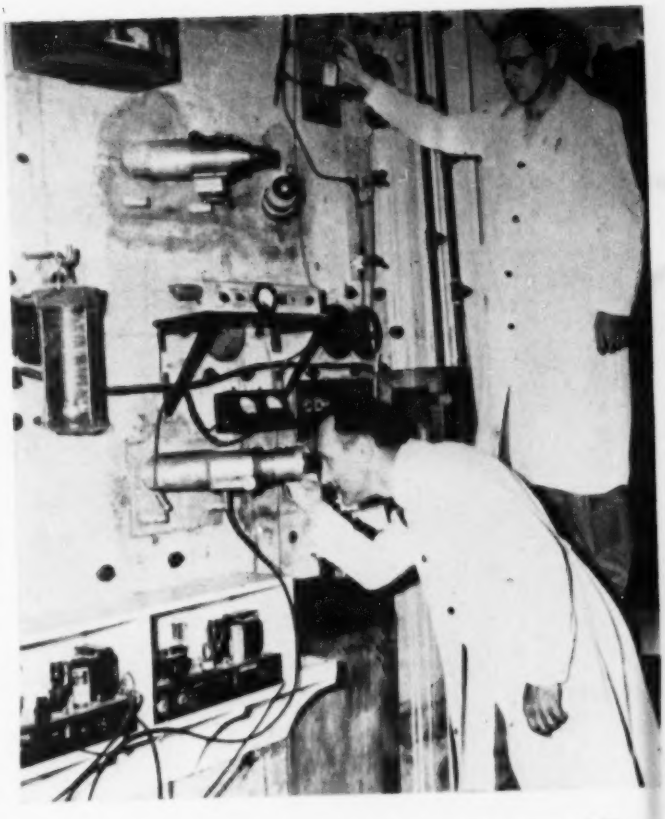
However, prior to the development of the A-bomb, isotopes were principally regarded as physical phenomenae—hypothetical particles of matter, which were of primary interest in classroom discussions and in the development of new scientific theories.

In the production of an A-bomb, heavy elements such as uranium are bombarded with minute electrical particles so that the isotopic constituents of the materials will be split or broken up into sub-atomic particles which are chemically unstable and, therefore, quite explosive.

Other elements—such as iron, calcium, carbon, sulfur, phosphorus, cobalt, silver, nickel, tungsten, copper, and zinc—merely become radioactive when they are subjected to the bombardment that converts uranium into an explosive. Ergo, the by-products of A-bomb production work are technically known as "radioisotopes."

The latter isotopes are comparable to many natural materials—such as the galena crystals used by youngsters in constructing "catwhisker" radio receivers—except for the fact that they may produce different radiations with relatively large or small degrees of intensity, due to the inherent electrical properties of the atoms and extent of their nuclear instability.

Radiations from radioisotopes are respectively known as alpha, beta, and gamma rays. Alpha rays have a positive electrical charge and constitute a natural phenomenon of radium; beta rays may have either a positive or a negative charge, are characterized by the fact that their particles travel with the speed of light, and have been used for many years to propagate radio signals in the atmosphere; gamma rays comprise electrically-neutral particles,



Although the United States Government has spent many billions of dollars for equipment to produce A-bombs, many atomic by-products are available to American industry at remarkably low costs in terms of materials and equipment.

are capable of penetrating numerous materials, and include (among other things) the radiations commonly known as X-rays.

Radioactivity in general can be attributed to the conversion of material substances into electrical energy, due to the instability of ruptured atoms, and may be preserved (much the same as the energy of a permanent magnet is preserved with a "keeper") or completely dissipated over a long or short period of time.

Accordingly, radioisotopes are fundamentally useful as sources of energy in forms that could not easily or inexpensively be generated with natural materials or equipment.

For instance, in the Industrial Radiography Laboratory at Beaumont, Texas, the atomic by-product known as "radio-cobalt" has been successfully used to detect flaws in steel parts with thicknesses ranging to 15 in.—much the same as the gamma rays of X-ray equipment would be used, although equivalent results cannot be obtained with the most expensive 1,000,000-volt X-ray machine.

Since the radiations of radioisotopes may be quite intense, workers must observe special precautions in handling the new materials if physical injuries are to be avoided in certain circumstances. However, experienced physicists at California Institute of Technology aver that the necessary safety devices and procedures are no more costly or complex than the analogies now used in virtually all modern industrial operations—for example, in the

operation of punch presses and in the handling of acids for pickling solutions.

Radioisotopes have been used with particular success by metallurgists as "tracers" for the analyses of different alloys, because the radioactivity of an isotope can be dispersed in the non-radioactive equivalent of any sub-

determine the causes and effects of different processing methods.

Large quantities of radioisotopes are not required as tracer materials. For example, a pinch of radiosulfur can permeate the sulfur contents of about 24,198 pounds of mixed coal for the production of steel.



Safety devices and procedures are required for the industrial usage of some radioisotopes, but are not extremely complex or expensive by modern industrial standards.

stance. For instance, engineers for General Electric Company and Westinghouse Electric Corporation have used small quantities of radiophosphorus, radiosulfur, radiocarbon, and radiotungsten to "contaminate" the phosphorus, sulfur, carbon, and tungsten contents of various alloys so that quantities of the latter ingredients could be measured in terms of radioactivity to

Therefore, the radiations of radioisotopes dispersed as tracers are usually too small to endanger inspection personnel; and, since these radiations are subject to diminution without appreciably varying the quality of a finished product over a period of time, there is every reason to believe that radioactive tracers can be extensively used to control production processes as well as

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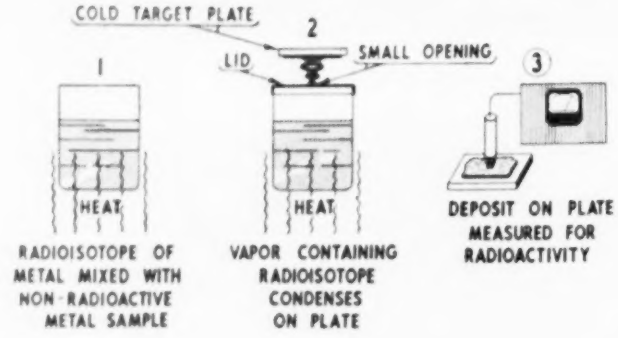
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in laboratory investigations.

Dow Chemical Chemical Company of Midland, Mich., has found one of the more interesting uses for radiocarbon tracers in an effort to determine the effects of carbon in altering the grain size and physical properties of magnesium alloys; and, consequently, it is believed that the commercial usefulness of magnesium should be greatly increased in the immediate future.

Eastman Kodak Company of Rochester, N. Y., is using radioactive gold as an analytical tool in connection with metallic silver to improve the photographic materials which are now so vital to numerous industrial operations.

Edward S. Gilfillan, Jr., consulting engineer of Manchester, Mass., developed what is probably the first com-



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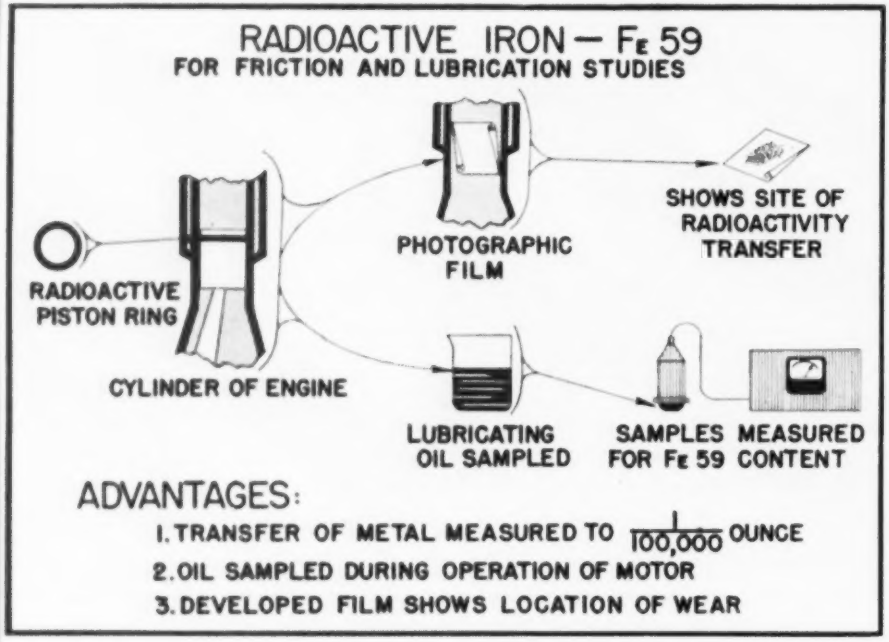
DETROIT 20, MICHIGAN

mercial application for radioisotopes as integral components of finished products by using radiocobalt and radiostrontium to facilitate the measurement of electrostatic charges on nonmetallic surfaces during various production-processing operations.

Similarly, Canadian Radium and Uranium Corporation has recently developed a "blow gun"—purpose of which is to ionize a jet of air with a radioactive filter so that the air can be used to dissipate electrostatic charges (thus eliminating the tendencies of certain materials to accumulate dust or to serve as a starting point for disastrous fires or explosions).

B. F. Goodrich and Goodyear Tire companies of Akron, Ohio, have used radioactive iodine and related isotopes as integral elements in new-type measuring instruments which are said to detect dimensional variations of as little as 1 micron with unprecedented speed and accuracy. These instruments are used in work with extremely-thin film or sheet materials, and involve no mechanical contact with the materials as indicated by the following description provided by Goodyear engineers:

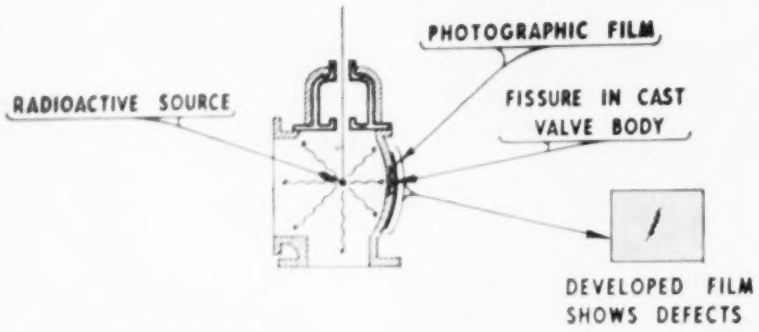
"The film passes through a slot in the gage. Below this slot there is a small quantity of the radioactive isotope. Above the slot, there is an ionization chamber in which a minute electrical current is produced by the rays from the isotope. The latter current is amplified by sub-miniature vacuum tubes to the point where it is sufficiently large to operate an ordinary electric meter, which is calibrated to indicate dimensions in terms of the strength of the rays in each circumstance. Further amplification could be used to actually




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control the film gage by regulation of the speed of the production machinery."

At Massachusetts Institute of Technology of Cambridge, Mass., radioactive iron and chromium isotopes are being used to treat mechanical parts so that the effects of friction can now be determined with phenomenal accuracy—making it possible to detect transfers of materials amounting to less than 5 micrograms of metal when two surfaces are rubbed together, and suggesting the possibility that transfer is an inherent concomitant of friction.

Investigators at Mellon Institute of Pittsburgh, Penn., have used a mixture of carbon monoxide and radioactive

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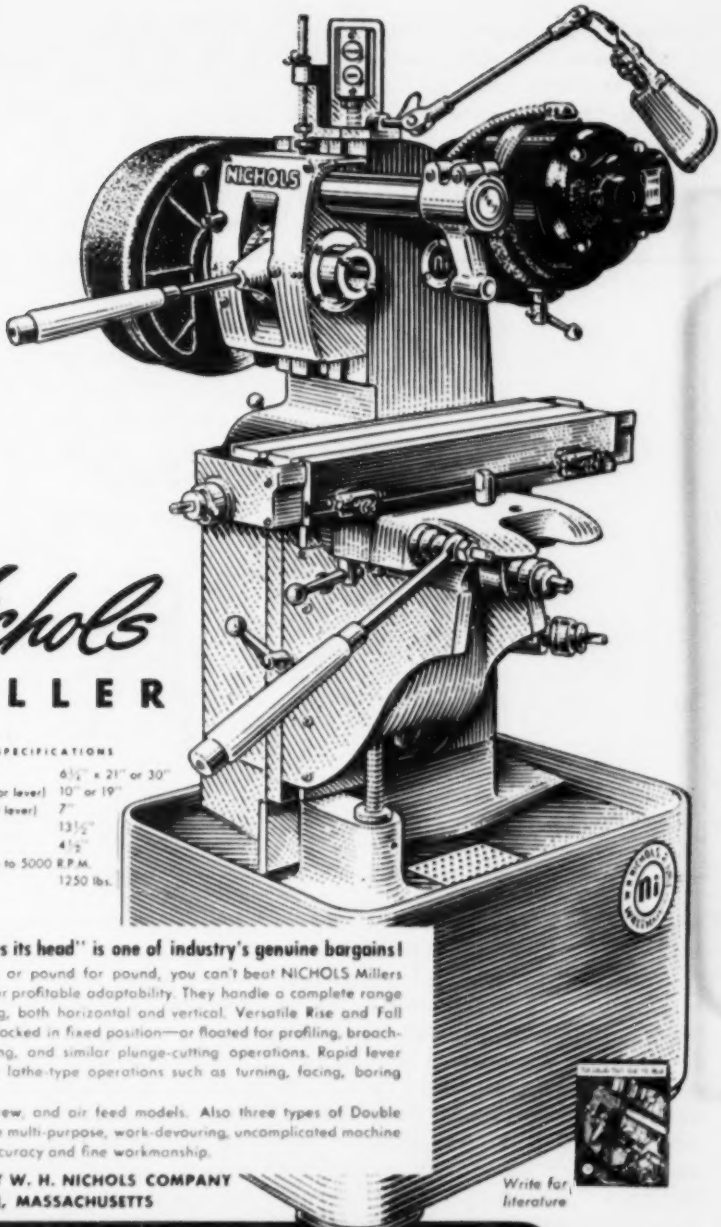
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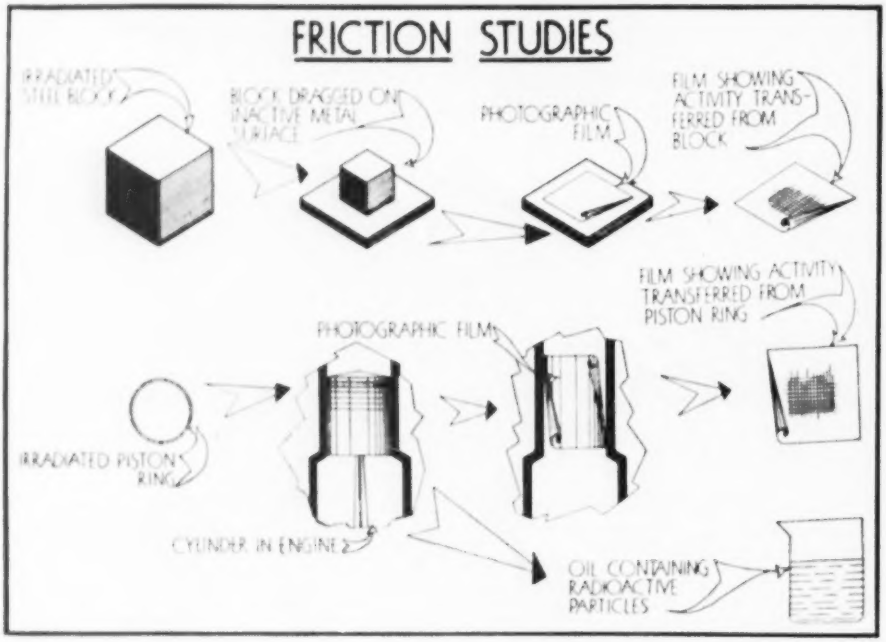
carbon to prove that in the mechanism of the Fischer-Tropsch process hydrocarbon synthesis does not take place through the intermediate formation of metallic carbides but through another mechanism, details of which remain to be determined. When and if the latter investigations are completed, many improved fuels will no doubt be developed for general industrial usage.

In the Socony-Vacuum Laboratories at Paulsboro, N. J., radioactive iron is being used to provide bearing surfaces for machine components so that the efficiency of various lubricants can be determined in accordance with the tendencies of the bearing surfaces to permeate the lubricants with radioactive particles. Resultant measurements have indicated a sensitivity of one part in ten million in as little as 20 milligrams of oil.

Researchers for Stevens Institute of Technology of Hoboken, N. J., are using radioactive isotopes of zinc and copper to study self-diffusion in stressed metals as follows:

"Single crystals of the metal are electroplated with the isotope material and then placed under stress in a furnace at temperatures approaching the metal's melting point. When the isotope has had sufficient time to diffuse into the crystal, the specimen is removed and sectioned. The activity of the sections is measured to obtain the amount of diffused material at various distances from the original plated surface. From this, the diffusion coefficient and the activation constant may be ascertained. The general technique is nearly identical for both copper and zinc."

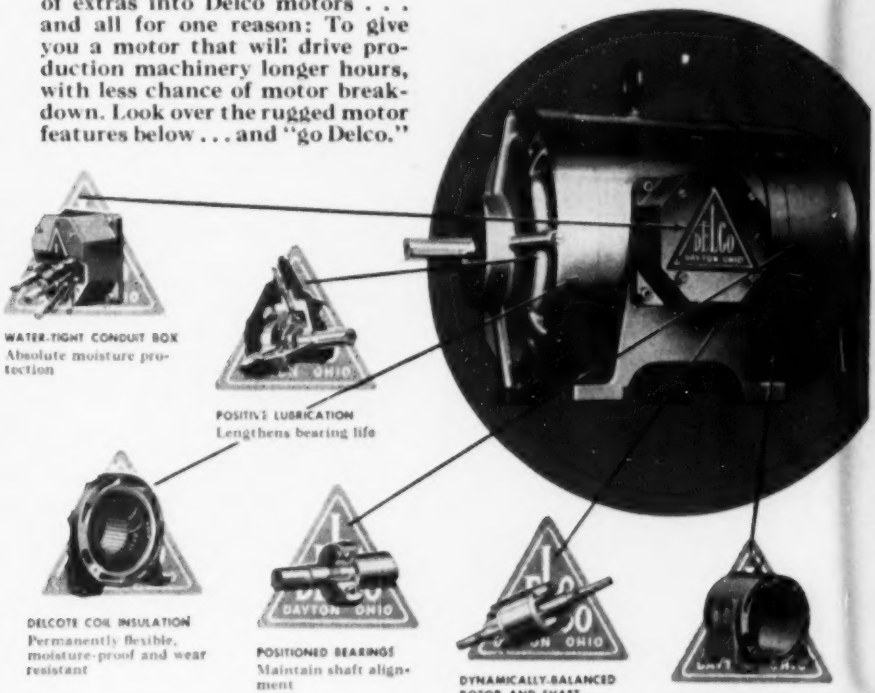
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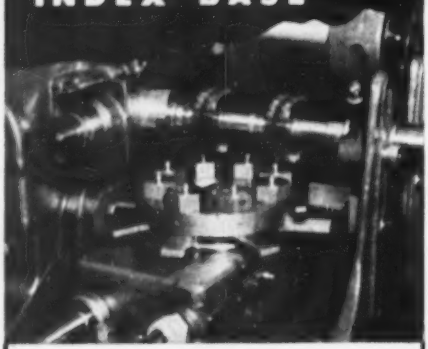
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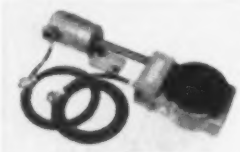
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of radioisotopes for various industrial purposes are now known to be in actual use as well as in a current state of development, but will not be discussed in this article due to a lack of space. However, it is believed that the foregoing facts should at least indicate some of the more important potentialities of atomic by-products; and that the reader who requires further information will find the following Bibliography most helpful.

BIBLIOGRAPHY

Government Publications:

SEMI-ANNUAL REPORTS OF THE ATOMIC ENERGY COMMISSION, available from Supt. of Documents, U. S. Government Printing Office, Washington 25, D. C.

ISOTOPES CATALOG AND PRICE LIST, available from Isotopes Div., Atomic Energy Commission, Sox E, Oak Ridge, Tenn.

SAFE HANDLING OF RADIOACTIVE ISOTOPES, available from National Bureau of Standards, Washington, D. C.

Miscellaneous:

INDUSTRIAL USES OF RADIOACTIVE MATERIALS, a selected bibliography published by Arthur D. Little, Inc., Cambridge 42, Mass.

OAK RIDGE NATIONAL LABORATORY RESEARCH AND RADIOISOTOPE PRODUCTION published by Carbide & Carbon Chemicals, P. O. Box P, Oak Ridge, Tenn.

RADIOISOTOPES — A SURVEY published by Kellex Corp., 233 Broadway, New York 7, N. Y.

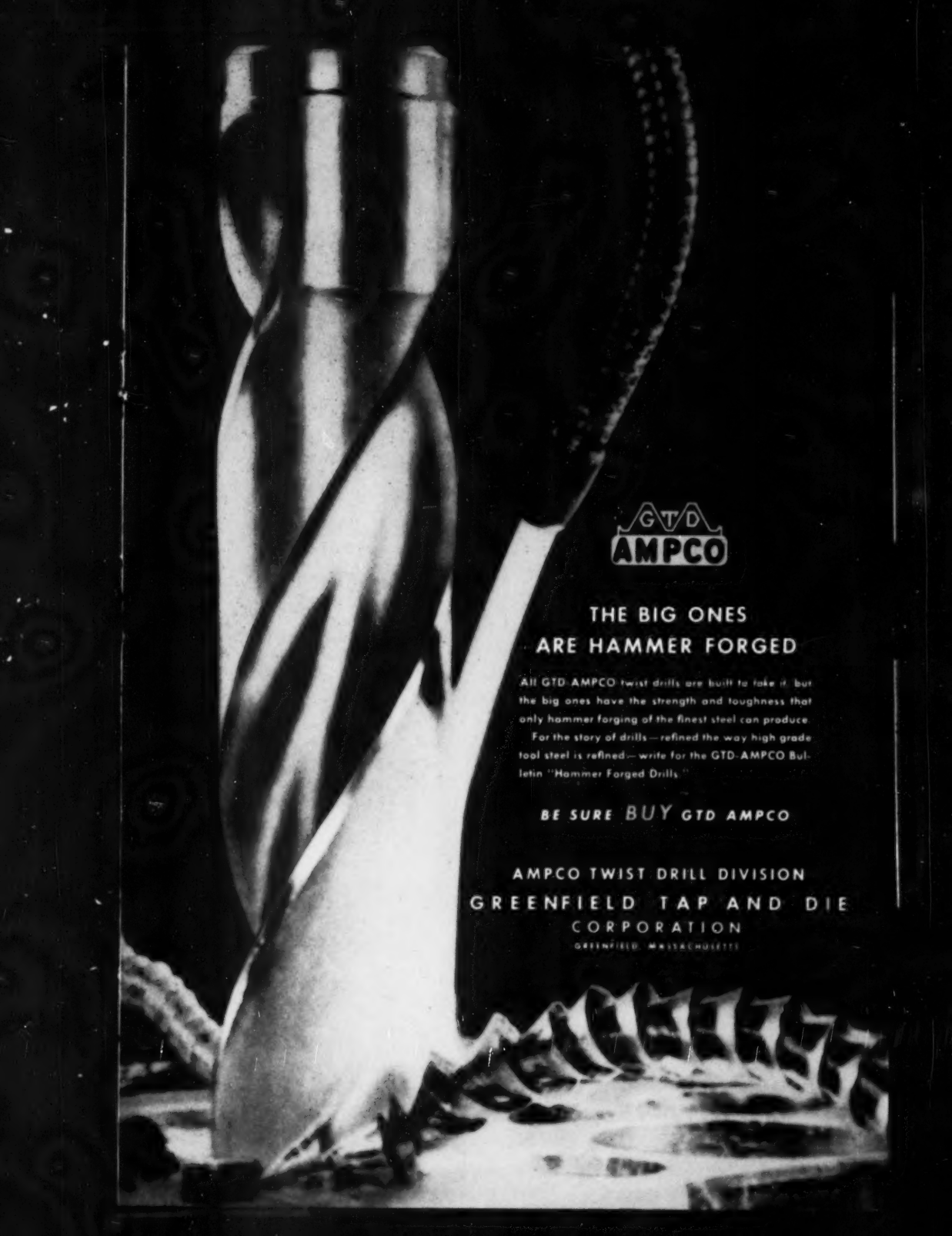
Stanley: CARBONIZING EXPERIMENT WITH RADIOACTIVE CARBON published in Metal Progress; 52, 227 (1947).

Labaw: AN INSIDE GEIGER-MULLER COUNTER FOR SOFT BETA EMITTERS published in Review of Scientific Instruments; 19, 390 (1948).

Gaudin: RADIOACTIVE TRACERS published in Engineering and Mining Journal; 53, March (1948).

Stanley: SOME POSSIBILITIES OF RADIOACTIVE TRACERS IN METALLURGY published in Nucleonics; 1, 70 (1947).

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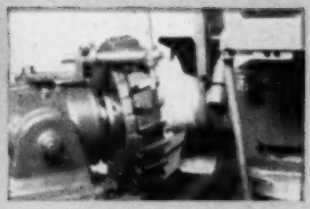
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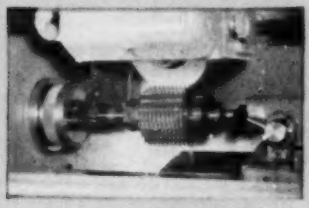
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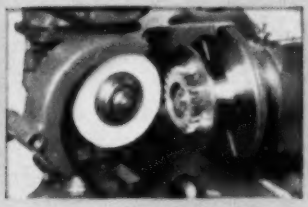
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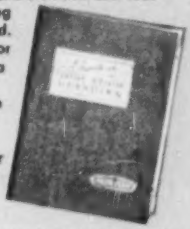
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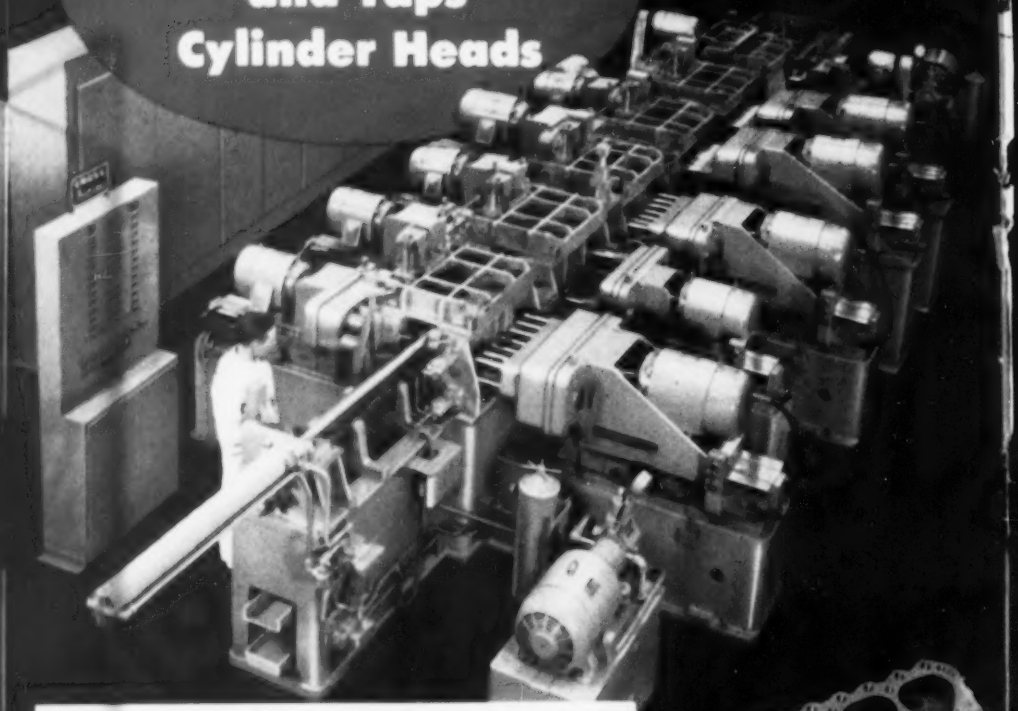
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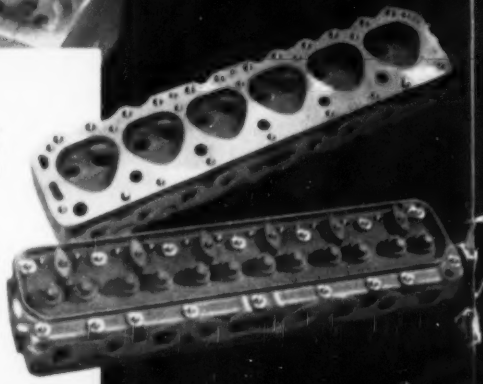
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Highlights of Papers Presented at ASTE Know-How Session

THAT multiple thread hubs should not only speed gear production but should also give better tool life than single thread hobs, if correctly designed and used, was indicated in a paper by D. A. Moncrieff, Assistant Chief Engineer, and Harry Pelphrey, Research Engineer, Michigan Tool Company, Detroit. Moncrieff and Pelphrey based their comparison on equivalent total chip removal for both types of hobs.

Climb hobbing according to the authors generally gives results superior to conventional hobbing. "Climb hobbing is rapidly becoming the conventional method, and 'conventional' hobbing the unconventional," Moncrieff stated.

The authors warned that multiple thread hobs cannot increase production in direct ratio to the number of threads, due partly to machine limitations. A double thread hob, they said, will increase output about 35 per cent over a single thread hob, however.

Prime reason for the increased tool life for multiple thread hobs when used in climb hobbing was the better chip load distribution obtained on the hob tooth, the Michigan Tool engineers found in an extensive study of chip formation by different types of hobs.

When multiple thread hobs are used, they added, these should be of larger diameter than comparable single thread hobs in order to permit use of a larger numbers of flutes. Spiral-gashed multiple thread hobs are preferable to straight gashed hobs, they said.

o

Machinability of Steel Accurately Measured by Constant-Pressure Lathe

A newly-developed "constant-pressure" lathe which can accurately determine how difficult or how easy a metal will be to machine in actual manufacturing was described by Francis W. Boulger, Supervising Metallurgist at Battelle Memorial Institute, Columbus, Ohio.

The lathe operates with a constant pressure feeding the tool into the work, supplied by a weight-and-pulley system. As the carriage moves, the cable pulling the carriage rings a bell with every 0.002 in. of carriage travel. Every time the bell rings, the operator records the number of revolutions the spindle has made.

Feed, according to Mr. Boulger, is a more sensitive indicator of machinability than tool pressure. The test results agree quite closely with other means of determining machinability, and very closely with tool life actually observed on production runs.

Postage-Stamp Size Gage Performs Miracles of Measurement

A simple gaging device the size and thickness of a postage stamp can measure minute or extremely heavy loads, dimensional changes of a millionth of an inch, or temperature changes ranging near absolute zero to 1600 degrees above.

Francis G. Tatnall, Manager of Testing Research at Baldwin Locomotive Works, Philadelphia, described the instrument at the annual meeting of the American Society of Tool Engineers, designed to "mobilize" the production know-how of tools engineers in the United States and Canada.

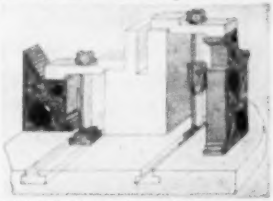
The simple device consists of a wire one-third the thickness of a human hair which is wound back and forth, then coated with cement. If the "gage" is distorted so that the wire is stretched or contracted, its resistance to passage of an electric current is varied. Measurement of the variation tells the exact amount of stretch. The instrument will measure a dimensional change of a millionth of an inch of length.

One application of the gage is in testing military jet engine blades while they are in operation. The gage is cemented to the blade, a current passed through it, and the engine is run. Any bending of the blade stretches the wire and changes its conductivity, which is then registered on a meter. Thus the engineers can tell exactly what is happening to a spinning blade while the engine is in operation.

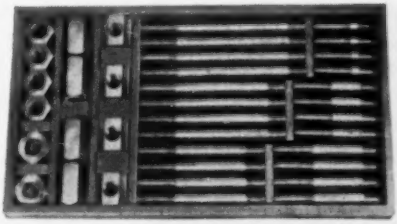
Conversely, to weigh the load on a bridge, the gage is cemented to one of the supports. A change in load causes the support to "give" a slight amount. This is immediately registered by the gage. Simple calculation then determines the exact load that caused the support to "give".

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TOOL AND DIE MAKERS—EST. 1926

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Mechanical Failures Forecast by Coating Process

A testing process which can forecast weeks and months in advance where failure will occur in an airplane engine or other mechanical products—and enable engineers to change the design to prevent such failures—was described by Greer Ellis, consulting engineer of the Magnaflux Corporation, New York City.

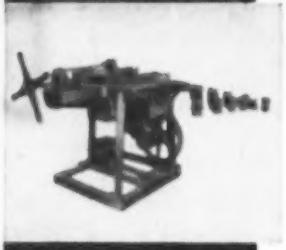
The test involves the use of an extremely brittle material known as "Stresscoat" which is sprayed on the part to be tested in much the same manner as paint. When the test part is subjected to the same kind of load it will undergo in service, the metal deforms or stretches slightly in an amount proportional to the load. The brittle coating, however, will not stretch and cracks like glass at the points where the strains are the heaviest. The coating can be made to crack when the metal beneath it is deformed as little as one ten-thousandth of an inch per inch of length.

Metal parts, the tool engineers were told, fail from "fatigue" in service only after being subjected to the same load millions of times. The Stresscoat fails the first time the load is applied, and in the same place where the part will eventually fail in service. By testing one sample part, the engineers can predict and avoid troubles that would ordinarily not begin to crop up until the part was in full-scale production and many were in actual service.

The coating is being applied to testing of aircraft engine connecting rods, wings and structural parts, and critical components of many different mechanical products.



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Capacity ½" to 2" standard pipe . . . Minimum radius 5 times pipe diameter up to 180° . . . Maximum radius 13". Complete with rolls for each size pipe. Standard motor equipment 2 h.p.

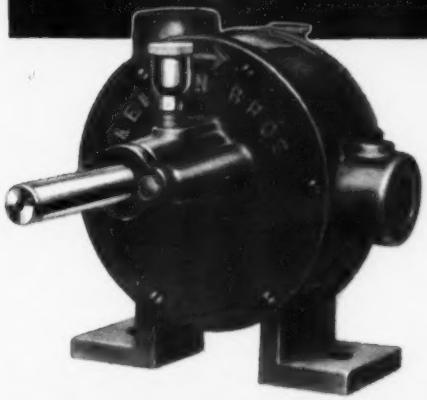
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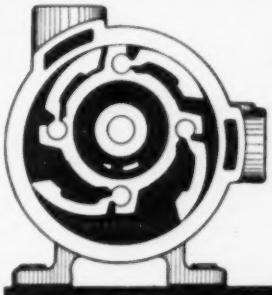
COUNTLESS jobs are done faster, simpler, less expensively by using pressure, vacuum or suction provided by Leiman Air Pumps. Air is the only reliable, trouble-free solution to many operations. Learn more about the great possibilities of designing with air. Leiman engineers offer over 60 years' experience with thousands of air applications. Outline your application for recommendation and suggestions. Write for data outlined below.

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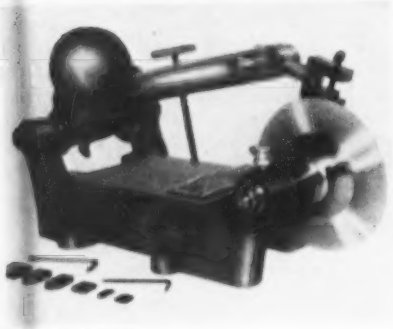
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UNION CUT-OFF MACHINE



WHAT IT DOES:
Cuts broken sections off damaged carbide tools without grinding.
Cuts standard carbide blanks to any desired size.
Saves time-consuming grinding on carbide tools.
Saves carbide tools that otherwise would be scrapped.
Saves you money on costly diamond grinding wheels.
Saves you money by making possible the purchase of large-size standard carbide blanks.
Simple to operate and automatic in operation.

SPECIFICATIONS:
½ H.P. motor, 1725 R.P.M. 110 Volt. Overall size 7" x 12" x 8" high. Supplied complete with diamond cutoff blade and motor for $275.00 F.O.B. Stamford, Connecticut.

LITERATURE ON REQUEST

UNION
WIRE DIE CORP.

71 W. 45TH ST. N. Y. 19, N. Y. **PLANT: STAMFORD, CONN.**

Plunge Grinding Can Speed Production

FRANK W. CURTIS, Chief Tool Engineer, Machine Tool Div., the Van Norman Company, Springfield, Mass., and a past president of the American Society of Tool Engineers, discussed the potentialities and application of plunge-cut grinding as a cost-cutting, production-speeding method where close-tolerance production is involved.

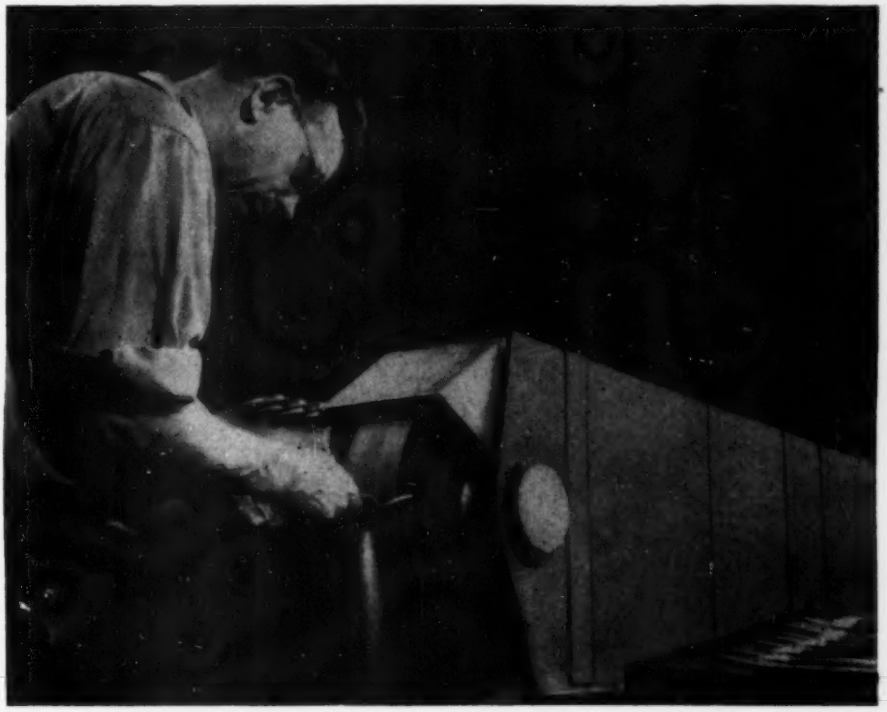
As an outstanding advantage of plunge-cut grinding, Curtis pointed to the speed with which journals or bearing surfaces can be finish-ground to close tolerances. He also described effective techniques of plunge-grinding diameters and shoulders at the same time; and wheel dressing techniques for either flat or formed surfaces. The limiting factor in plunge-cut grinding, according to Curtis, is the length of the journal to be ground or the spacing between surfaces to be ground at the same time.

o

Machine Vibrations Confined By Flexible Mounts

MEANS of isolating and confining destructive, annoying or costly machine vibrations were outlined in a symposium. A. P. Pfenninger, Jr., Chief Engineer of Connecticut Hard Rubber Co., New Haven, Conn., and Donald Vance, Assistant General Manager and Executive Engineer of the Korfund Co., Long Island City, New York, participated in the symposium.

The speakers pointed out that it is not always practical or possible to design machines that will be in balance throughout their operating life, and under any operating condition that might be imposed on them. Yet vibration originating in one machine can



Could a wheel do it better?

A widely accepted method of finishing many parts and tools is by application of an abrasive belt of certain specifications. Yet, it is entirely possible that an improved method may some day be devised—the use of a special-type abrasive wheel, for instance...on a new type of polishing wheel.

Should this ever occur, CARBORUNDUM would undoubtedly be among the first to produce the right wheel. But, *even more important*, we would be fully prepared to explain the pros and cons of both methods. Because only CARBORUNDUM makes a *complete* line of abrasives...we can recommend *impartially* the right abrasive for every application based on our experience with all abrasive products.

Perhaps the past few years have brought new developments in abrasives of which you are not aware—developments which could provide increased production, efficiency and economy for you. Your CARBORUNDUM representative will gladly give you impartial technical advice on proper application to your processing.

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destroy the accuracy of other machines, contribute to wear, and even cause danger to a building.

They described the engineering characteristics and applications of various types of rubber and steel spring mountings which have been developed to isolate such vibrations.

—o—

Production Milling Operations

ESSENTIAL considerations in selecting the proper milling equipment and methods for production jobs were outlined by Robert A. Winblad, Supervisor of Estimating, Milling and Broaching Division of Cincinnati Milling Machine Co., Cincinnati.

Mr. Winblad in outlining five basic points in considering production milling methods said that any set of rules is only a basis for exercising of tool engineering ingenuity in each case.

Specialized Defense Plant Layouts

A SOLUTION to the problem of effective plant layout for precision manufacturing of complicated products was outlined by G. A. Richroath, Manufacturing Engineer of Sperry Gyroscope, Great Neck, Long Island, N. Y.

According to Mr. Richroath, Sperry has found the "colony" type of machine arrangement best suited to precision products which are not mass produced (at least not in the sense that autos and refrigerators are mass produced.) In this system of plant layout, machines and skills are grouped together, with adjacent departments arranged in a logical sequence; from automatic screw machines to second-operation machines, drilling machines, and so on.

All tools in this plant are controlled from a central crib to make tool supervision easier and avoid duplication of perishable tools, gages, and so on.



REDUCE HANDLING
of Tools, Parts and Materials

Because Stackbins are portable containers — not fixtures — tools, parts and materials can be carried to departments, from machine to machine, or held in stockrooms without being transferred from one container to another. Stored in Stackracks, any Stackbin is instantly accessible when its contents are needed — without disturbing any other bin. *Stackbins* — individual hopper-fronted stacking bins, slide like drawers in *Stackracks* — individual units which lock together to form racks of any size, shape or capacity.

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PRODUCTION ASSEMBLY PROBLEM

Our thoroughly trained engineers are ready to design equipment for your individual needs . . . No package goods . . . Whatever we furnish you will be planned for your particular purpose . . . And our 25 years of specialized experience qualifies us to do your job successfully . . . Thousands of manufacturers have profited immeasurably through greatly stepped-up production as a result of our service. You, too, can benefit likewise by the use of D.P.S. power-driven machines. Get further details. Mail the coupon today . . . Also send sample assembly for production estimate.

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Supersonic Sound to be Used for Faster Inspection of Metal Products

ULTRASONIC sound—sounds pitched beyond the range of hearing—offers industry a new way to "look inside" both raw materials and finished products in inspecting these for flaws. H. E. VanValkenburg, Sperry Products, Inc., (Danbury, Conn.) engineer described the method at the annual meeting of the American Society of Tool Engineers as part of a program to exchange new and up-to-date technical information among the "men with production know-how."

The sounds used range in frequency from 100,000 cycles per second up to ten million cycles or more (15,000 cycles is about the top range of human hearing.) Such high-pitched sounds can be directed along a narrow path like a beam of light. To test a steel plate, for example, the beam is directed through the plate; then if the beam strikes a hidden flaw, such as a crack in the material, part of the beam is reflected and will register on a meter.

The new ultrasonic method has a wide range of usefulness: Flaws and porosity can be detected deep within a 50-ton steel rotor where X-rays could not penetrate, and within aluminum forgings less than ¼ inch thick. As compared with X-ray inspection, the ultrasonic method requires no photographic plates or lead-shielded rooms. In fact, portable, battery-powered equipment has been developed that can be carried to the job.

o

Arc Welding Process Greatly Improved Since World War II

ARC welding, a process of primary importance in fabricating defense materiel such as tanks, planes and ships

People work better when they SEE BETTER



MAGNI-FOCUSER's matched prismatic lenses give needle-sharp magnification. Comfortably light weight. Fits over regular glasses. Leaves both hands free. Normal vision may be resumed by lifting head.

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Gauge reading, layout work, inspection, tool and die work are just a few of the jobs that need the Magni-Focuser. Speeds precision assemblies, blue print work. Restores the usefulness of the skilled hands of many older workers whose vision needs a seeing aid.

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Prior to moving into their new plant, Berger tested the *modern* way to mount machinery — on UNISORB. A number of inclinable presses of different sizes were chosen for the test. In the standard manner, the feet of the press were cemented to UNISORB pads, which in turn were cemented to the floor. After 6 months of working at top speed on practically a 24 hour a day schedule, the presses were anchored as firmly as ever.

All Berger presses and other machinery are now mounted on UNISORB. The company has noted 75% savings in time and labor installing and repositioning machinery. Couple these savings with reduced wear and tear on machinery and buildings (UNISORB absorbs from 60% to 85% of transmitted vibration and noise) and we think you'll see your way toward important savings for *your* company.

Write today for sample and specifications. Ask for your copy of "Why It Pays To Anchor Your Machines With UNISORB."



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Look for the RED BAND

You no longer have to guess whether you are overloading your live center thrust bearings if you use MOTOR TOOL LIVE CENTERS. When the load is too great the RED BAND around the spindle disappears into the housing. You can see at a glance when overloading occurs. This is an exclusive feature, developed by Motor Tool which cuts repair costs to practically nothing if due diligence is exercised. As long as the RED BAND is visible you are running COOL and SAFE.

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N E W descriptive folder . . . and verified case histories of how MOTOR TOOL LIVE CENTERS have out-performed and outlasted ALL other centers on exceedingly tough, continuous-run jobs.

MOTOR TOOL MFG. CO.
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—has been greatly improved since World War II by the addition or two new methods, according to H. O. Jones, Welding Specialist of Air Reduction Sales Company, New York City.

Jones said that the new methods require the use of inert helium or argon gas. These gasses shield the welding arc and the white-hot area of the weld from the destructive effects of oxygen. Thus, it is possible to weld faster without "burning" the metal and weakening the joint.

In one production line using the new methods, welds in $\frac{1}{4}$-inch thick bronze plates are welded together with the machine closing 180 feet of seam per minute. In another case, using a tungsten electrode shielded by an inert gas, stainless steel tubes only $\frac{1}{8}$-inch in outside diameter were welded. After welding, the tubes withstood 500 lb. per square inch of internal pressure, Jones said.

Examples of new uses of the processes in manufacture of jet engines, aircraft, and so on, were also given. The methods respectively used either tungsten or metallic electrodes.

o

Lubricant Practice for Metal Forming Outlined

A COMPREHENSIVE summary of best lubricant practice for the forming of vital defense metals was given by E. L. H. Bastian, Senior Engineer of Shell Oil Company, St. Louis, Mo. As part of his analysis, Mr. Bastian compared lubrication of metals and dies in press forming and extrusion of metals with the practice in lubricating of machines.

Metals covered in the study included not only conventional steels but also aluminum, magnesium and some of the "high alloys" as used in jet engines, and so on.

U. S. PAT. NO. 2, 32x, 217

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Apex pioneered and patented the original insert bit and bit holder.

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Apex offers the most complete line of insert bits, bit holders and hand drivers for use with insert bits.



INSERT BITS—You'll save on tool costs—and help to conserve vital steel supplies—by using Apex bit holders and insert bits. This modern method of production screwdriving is convenient and economical. One bit holder takes a complete line of inserts to drive Phillips, Frearson (Reed & Prince), Slotted, Clutch Head and Socket Head screws. Bit holders, made to fit all popular makes of air, electric or spiral drivers, last indefinitely. Insert bits, quickly and easily interchanged in the holder, are simply discarded when worn.

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POWER BITS—For applications requiring the use of conventional power bits, Apex offers a full line of precision-built, one-piece bits. Standard hardness (dark finish) for soft screws . . . X hardness (satin finish) for self-tapping screws.

For complete listing of Apex screwdrivers and bits, write (on company letterhead, please) for Catalog 20.

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Safety Friction Tapping Chucks • Vertical Float Tapping Chucks • Self-Releasing and Adjustable Stud Setters Power Bits for Phillips, Frearson, Slotted Head, Clutch Head, Hex Head and Socket Screws • Hand Drivers for Phillips, Frearson and Clutch Head Screws • Aircraft and Industrial Universal Joints • Sockets and Universal Joint Socket Wrenches.

Mechanical Brains May Replace Human Inspection In Manufacturing

MECHANICAL or electronic "brains", complete with memories, can now sort, measure and count much faster than humans and much more accurately. According to A. C. Sanford of Federal Products Corp., Providence, R. I., the devices can employ mechanical movement, air pressure, electrical or magnetic currents, or even radio-active carbon from an atomic pile. Capable of millionth-inch accuracy, they relieve operators of the tedium of repetitive operations. Cost of such a device may range from $1000 to $50,000.

One new way of applying the gaging devices is to attach them directly to production machines. Here, by automatically adjusting the machines so that they will produce only acceptable parts, the gages eliminate the need for inspection altogether.

In sorting parts to extremely close dimensional accuracy, one device has a theoretical capacity of 30,000 measurements per second. Another can measure rapidly-moving red hot steel. One device used in manufacture of glass tubing uses a mechanical "memory"; the tube is measured at the point it is manufactured, and many feet away where it is finally cut off, the machine "recalls" the measurement and directs the piece into a bin with the right size classification.

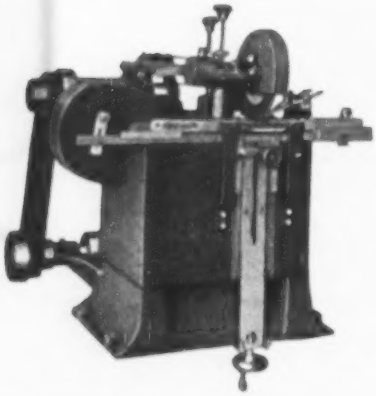
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Tap Performance Evaluated By Torque Tests

THE factors involved in tapping—one of metalworking's oldest but least-understood operations—have now been accurately evaluated through

PAYS for ITSELF in 1951

WITH SAVINGS IN HACK SAW BLADES ALONE



• SHARPENS HACK, CIRCULAR AND BAND SAWS

Instead of only 2 or 3 sharpenings per blade the EC Automatic Grinder sharpens hack saw blades 5 or 6 times before they require replacement. The EC is fully automatic grinding from 30 to 75 teeth per minute. This is the only grinder that does not depend on the shape of grinding wheel edge to shape the cutting edge of the tooth. Write for Bulletin EC Combination Hack, Circular and Band Saw Grinder . . . . Wardwell Mfg. Company, 3166 Fulton Road, Cleveland 9, Ohio.

WARDWELL

Maker of largest line of saw and tool sharpening machines

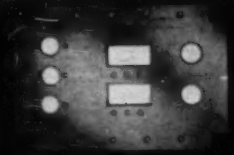
IT WILL PAY YOU TO COMPARE WIEDEMANN WITH ANY OTHER METHOD!

COMPARE PRODUCTION TIMES!



TIME FOR FIRST PIECE INCLUDING SET-UP — 10.10 MIN

TIME FOR EACH ADDITIONAL PIECE — 3.25 MIN



TIME FOR FIRST PIECE INCLUDING SET-UP — 8.55 MIN

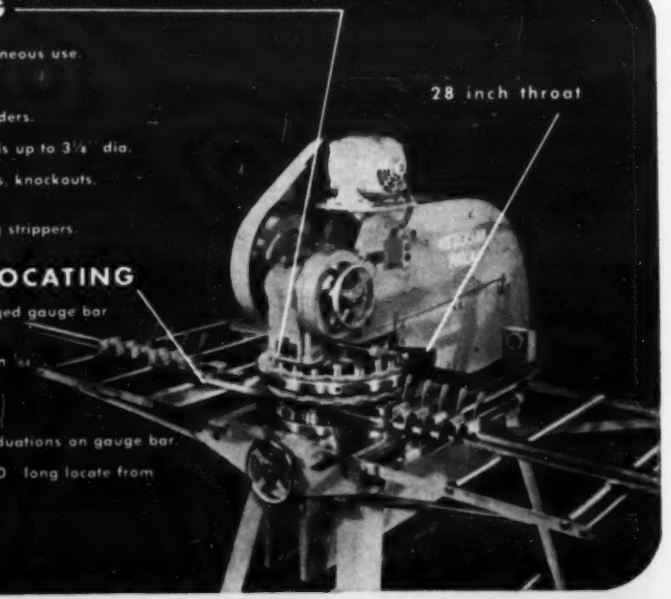
TIME FOR EACH ADDITIONAL PIECE — 2.75 MIN

COMPARE TOOLING

- 20 different tools ready for instantaneous use.
- Replace any tool in 20 seconds.
- Inexpensive punches, dies, and holders.
- No special adaptors needed for tools up to 3½" dia.
- Standard and special tools—louvres, knockouts, extrusions, etc.
- Positive stripping action—no spring strippers.

COMPARE WORK LOCATING

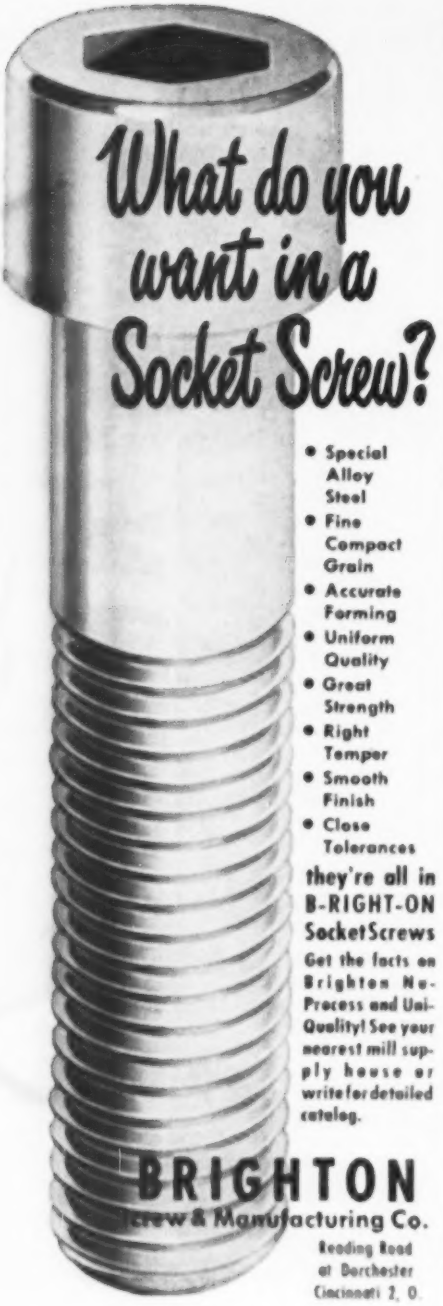
- "In and out" locations against rugged gauge bar (handwheel controlled).
- Dial shows "in and out" position in ½".
- Rigid heavy duty drop latch stops locate work for *all* size punches.
- Drop latch stops set directly to graduations on gauge bar.
- Handles work up to 120" long (60" long locate from one corner.)
- Roller top work supporting table.



WIEDEMANN

TURRET PUNCH PRESSES

WIEDEMANN MACHINE COMPANY
4219 Wissahickon Ave.
Philadelphia 32, Pa.



precision instruments which record tapping torque, according to Allen J. Carruthers, Research Engineer of Greenfield Tap and Die Corp., Greenfield, Mass.

Greenfield, according to Carruthers, has been testing tapping torques for about three years now with a new instrument developed by Greenfield and Ruge-DeForest, consulting engineers. The instrument uses bonded-wire strain gages and an oscillograph to check torques entirely independently of friction, etc., in the tapping machine.

Work materials used in the tests were: Cast iron, Graphmo tool steel, and SAE 1020 steel. Various tap grinds, both mechanical and free-hand, and various lubricants were tested at various percentages of full thread depth. The torque results have been evaluated and are now being made available in statistical form to the tool engineers.

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Defense-Essential Material Saved By New Process

A NEW pressworking process which can save up to 15 per cent of scarce sheet steel—and also accelerate production—was described by Melvin and Dan Verson, of Verson Allsteel Press Co., Chicago.

By using "mechanical hands" to move the part from die to die, the new presses eliminate the conventional scrap strip and thus use nearly all the material. The new presses, called "transfer" presses, have been built with bed length up to 11 feet and are capable of up to 450 tons pressure. They out produce other presses many times, it is claimed.

Ordinarily, when stamped parts require several operations for completion, these operations are divided among as many different stamping dies

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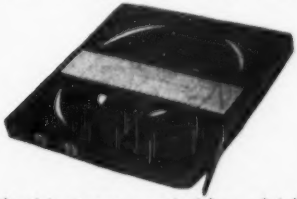


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and presses. Or they are performed in successive stages in the same die. In the latter case a strip of steel is fed into the press and the part is formed from the strip as it moves from step to step through the die. In the last stage the finished part is cut from the strip and the part of the strip which carried the piece is cut up into scrap. As much as 15 per cent of the steel was wasted this way.

o

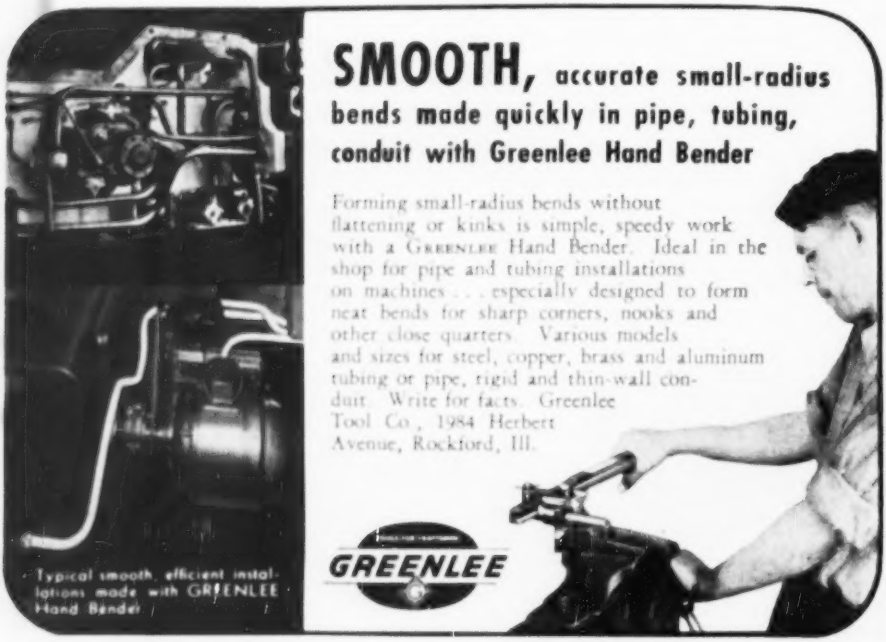
Sprayed Metallic Coatings May Replace Paints

METALS sprayed from a gun in much the same manner as paint can substitute for paint, do a better job, and cost less in many application, according to H. S. Ingham, Chief Engineer of Metallizing Engineering Company, Brooklyn, N. Y.

The metal—steel, zinc, copper, bronze, etc.—is fed in wire form into the gun where it is heated to its melting point. A jet of air then drives the metal from the gun in the form of a mist of microscopic droplets. When these droplets strike the surface to be sprayed they adhere and build up a coating on the surface.

At present, several applications of the method are at work in industry where zinc, for example, is sprayed onto a steel surface to prevent rust. In this application the zinc coating gives superior protection and costs less than painting. Other applications include spraying bearing metals on pistons, and so on, and building up worn machinery parts so that they can be re-used rather than discarded.

Although the metal comes from the gun in molten form, the droplets are so small that they do not burn and can be sprayed directly onto cloth or similar materials.



SANFORD

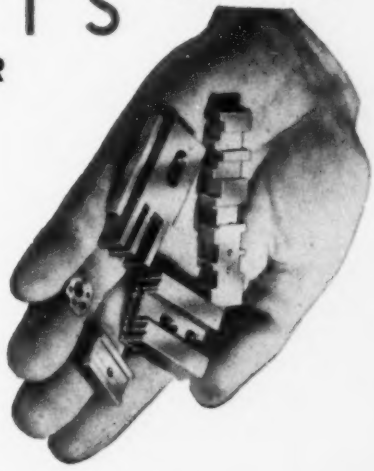
SURFACE GRINDER

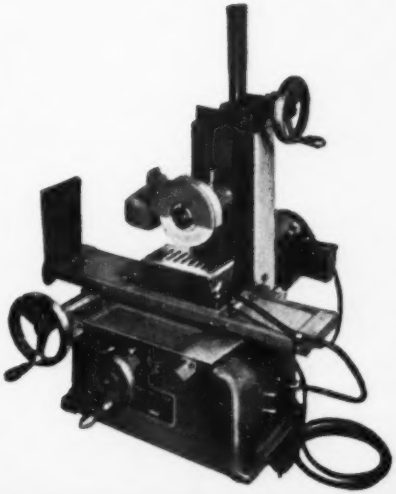
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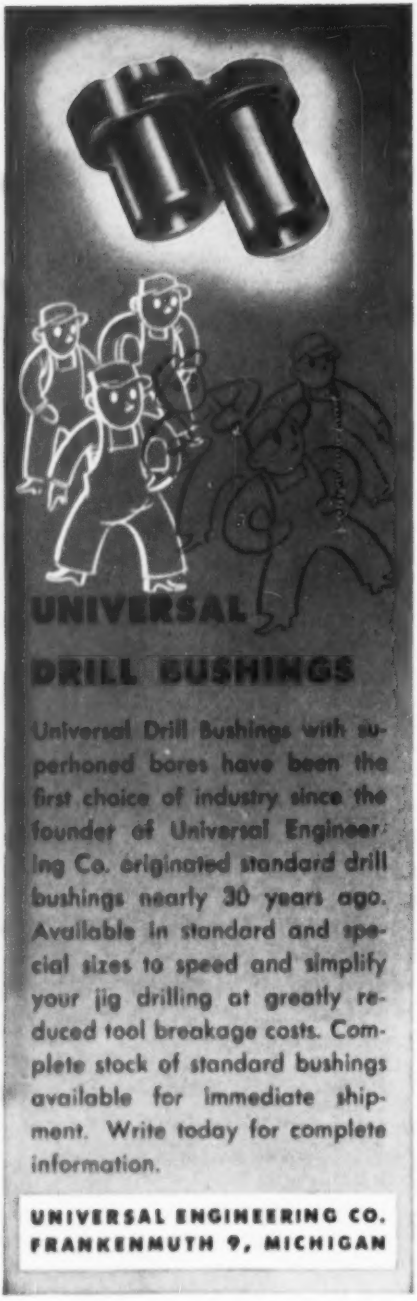




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New "Carbide" Steels Step Up Machine Output

PRODUCTIVITY can be increased on older machine tools which cannot utilize the superior cutting properties of carbides, according to Dr. W. R. Frazer of Union Twist Drill Co., Athol, Mass. New grades of high-speed steel which contain ultra-hard carbides have been developed which will accelerate performance from such machines.

The new tool steels, which Dr. Frazer termed "super-high-speed steels," contain vanadium carbide and molybdenum carbide particles. These particles, particularly the vanadium carbide, range up to Rockwell 85C in hardness —as hard as the material in many tungsten carbide tools. While the average hardness of the steel is much less than tungsten carbides, the presence of the hard particles enhance tool performance and life.

The new steels allow tools to be sharpened to knife-edge keenness and comparatively sharp angles (60 deg.). This reduces the power and rigidity required in the machine tool.

o

Grinding Method Said To Increase Production and Reduce Machine Investment

USE of continuous abrasive belts for grinding was recommended by W. A. Papworth, Staff Engineer of Porter-Cable Machine Co., Syracuse.

Pointing out that an 8-inch abrasive belt traveling at 5000 feet per minute flows 38,000,000 cutting grits over a metal part per minute, Mr. Papworth cited many instances in which both production and product quality had been improved by abrasive-belt grinding. For instance, in finishing the flat surface of an aluminum die casting, a milling machine produced 37 pieces per

MAGNETIC CHUCKS BY

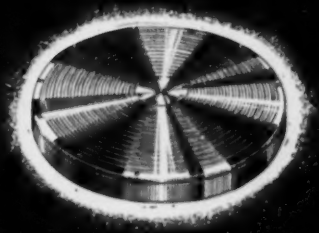
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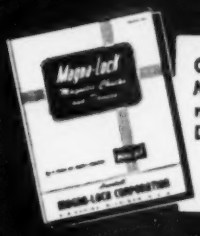


RECTANGULAR . . . work held to extreme edges of chuck. Sizes to 36" x 96".



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hour; when an abrasive belt grinder went to work on this job, production was more than tripled.

In addition to the advantage of higher speeds on many jobs, abrasive-belt machines cost only a fraction of the machines they sometimes replace, according to Mr. Papworth.

o

High Speed Optical Inspection Methods To Save Manpower

NEWLY-DEVELOPED methods in inspection by optical projection have made greater inspection speeds and accuracy possible at lower cost. According to Mr. Polidor, even a simple production part may require as many as 20 gages for its inspection, each inspection operation requiring a separate inspector. In optical projection inspection an image of the part—magnified from 10 to 100 times—is thrown onto a screen and a single inspector quickly checks it against an accurate, magnified-scale chart of its outline.

New projection methods using 1000-watt lamps have made the enlarged image of the part clear and distinct even in natural daylight. Other advances have come from chart forms which instantly indicate the high and low limits and whether the part is within tolerance.

o

Machine Tools Could Produce More

INDUSTRY hasn't even begun to reach the speed at which metals can be machined with carbide tools, according to W. R. Coomey, General Superintendent of Rice Barton Corporation, Worcester, Mass. New machine tools can be developed to operate several times as fast and turn out from two to ten times as much defense materiel per machine.

The Rice Barton tests indicate that





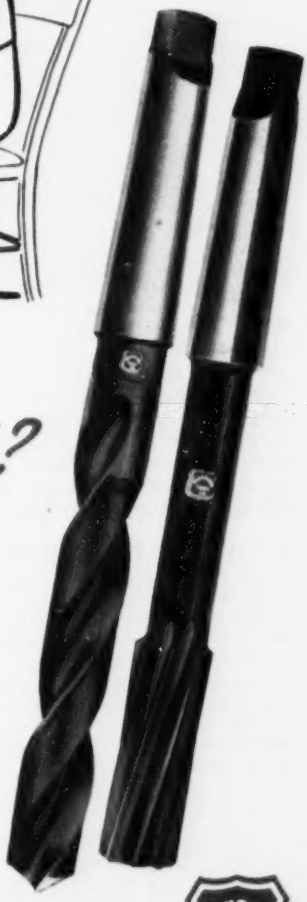
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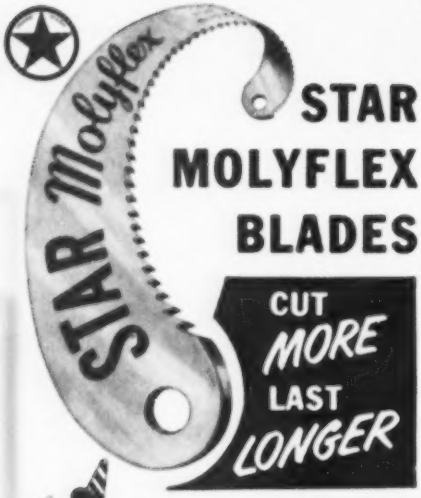


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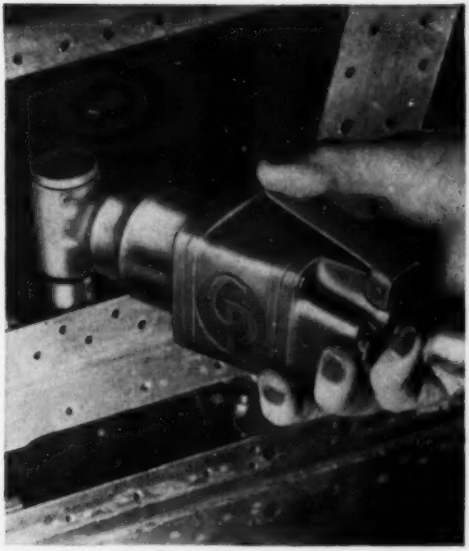
speeds at which the cutting tool moves through the steel at 16 miles per hour or better are entirely feasible. Main requirements, according to Mr. Coomey, are machines capable of the required speed and feed combinations.

If speeds and feeds are increased even beyond the point where tools begin to fail from the speed being too high, Mr. Coomey said, good tool life will return and the horsepower required will be reduced.

Mr. Coomey cited several supporting experimental examples. In one, milling cutter and workpiece remained cool at 1435 feet per minute, with 20/1000-inch feed per tooth. When the feed was reduced to 1/10th of this, both workpiece and cutter became too hot to touch, indicating that the decrease in feed was detrimental to tool life. In another test a planing machine consumed 92 horsepower when cutting steel at 100 feet per minute; when the speed was tripled, power consumption went down to 55 horsepower.



Compactness of CP-337 with 90° angle head speeds assembly work where nuts are hard to reach.





45° angle head on this CP-344 permits quick and easy location of socket on 5/16" frame bracket bolts.

for faster and easier bolt and nut running

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CP-3440	⅜", heavy duty
CP-349	⅝"
CP-360	¾"
CP-3630	¾", heavy duty
CP-365	1¼"

— on production lines, and in maintenance work — reversible CP AIR IMPACT WRENCHES speed operations, cut costs. There's no twisting thrust to fatigue operator.

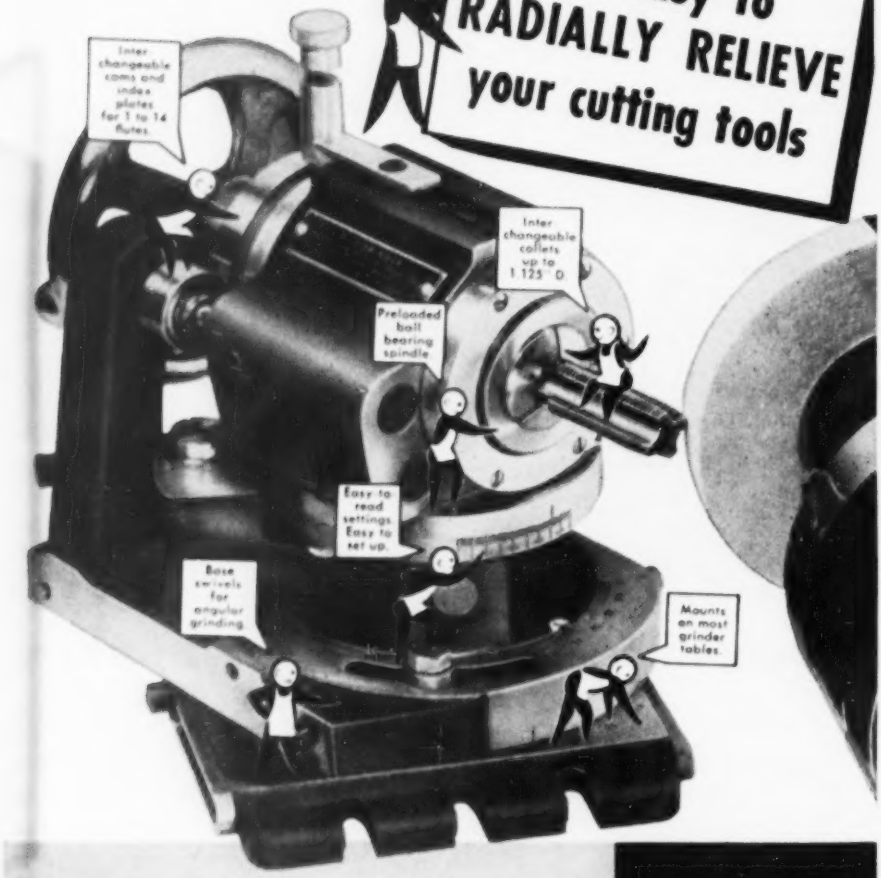
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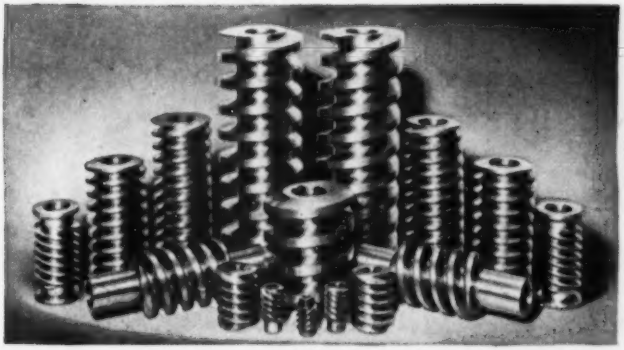
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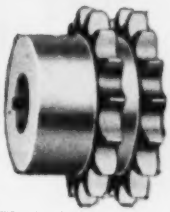
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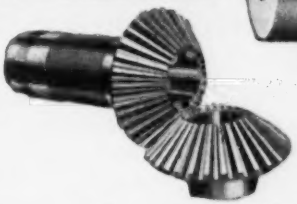
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Shaping of Metals Forum

Cincinnati, Columbus and Dayton Chapters of ASM will hold Tri-Chapter Meeting in Cincinnati, April 12, 1951

THE TRI-CHAPTER MEETING of the Cincinnati, Columbus and Dayton Chapters of ASM, which is to be held at the Engineering Society Headquarters building in Cincinnati on Thursday, April 12, 1951, promises to be the most outstanding in view of the subjects that are to be discussed and the standings of the engineers who have been selected to present papers. This year marks the thirteenth consecutive year in which these chapters have joined to sponsor a one day meeting of this type.

All of the papers to be presented were selected on the basis of their practical value to the metallurgist in the fabricating plant. All of the discussions should be of prime interest to engineers, manufacturing executives, managers and industrialists in allied branches of engineering. The program for the one day meeting is set up to allow the maximum amount of time for discussion following the presentation of each paper.

The meeting will open at 9:50 A.M. with a short welcoming address by Russell Hastings, Chairman of the Cincinnati Chapter, who will be followed by the program speakers. On the following pages is a synopsis of each of the papers to be presented, together with a partial list of the qualifications of each speaker.



Walter E. Jominy

National President, American Society for Metals

WALTER E. JOMINY, President, American Society for Metals, will take an active part in the proceedings of the Tri-Chapter Forum. He is scheduled to speak during the morning sessions and again at the end of the scheduled program of talks at which time he will summarize and correlate the important data presented by each speaker. Mr. Jominy, both as national president of the society and as staff engineer of the Chrysler Corporation, is particularly capable of fulfilling his assignment at this Forum.



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C. L. Altenburger

The Effect of Steel Mill Practice on Customer Requirements

By Clarence L. Altenburger

Research Engineer, Great Lakes Steel Corporation, Ecorse, Michigan

CLARENCE L. ALTENBURGER received his degree of Bachelor of Science in Chemical Engineering from the University of Detroit in 1926, following which he studied at the University of Michigan. He returned to the University of Detroit to serve as Professor of Chemical Engineering for several years. Later he joined General Reduction Corporation where he held the position of Technical Director. While in the employ of General Reduction Corporation he was engaged in the research work involving the smelting and reduction of iron ores. In 1934, Mr. Altenburger accepted the position of Research Engineer with Great Lakes Steel Corporation, a position which enabled him to assist in the development of the NAX type of steels. He also assisted in the development and production at Great Lakes Steel of more than million and a quarter ingot tons of steel for armor plate during the last war. His papers on various subjects have appeared in the SAE Journal, American Iron and Steel Yearbook, and Metal Progress Magazine.

IN his talk, Mr. Altenburger will draw upon his wide experience as a steel plant metallurgist to supply the answers to the following questions: What does the steel plant metallurgist do to control grain size; hardenability, and machinability characteristics? What effect does ingot size have? What does segregation mean to the user of steel? What is porosity? What is meant by "H" bands? Why do some steels give better yields than others? Why does he use etch tests? Why must he specify certain percentages and reductions in different operations? Why are billets over a certain size not guaranteed for soundness?

o



R. S. Burns

Drawing and Stamping of Iron and Steel Sheets

By Robert S. Burns

Associate Director, Research Laboratories, ARMCO Steel Corporation, Middletown, Ohio

MR. R. S. BURNS is Associate Director of the Research Laboratories of the ARMCO Steel Corporation, Middletown, Ohio, and has had charge of research and development work in the field of drawing sheets for the past twelve years. He was born in Columbus, Ohio, received his early education there and graduated from Ohio State University in 1930 with a Bachelor of Arts Degree. Papers published in American Society for Metals, American Iron and Steel Institute, and American Society for Testing Materials served as thesis for his Metallurgical Engineering degree which he obtained in 1937 from the Ohio State University. He was co-author in 1933 of the paper "The Aging of Mild Steel Sheets" and was awarded the American Iron and Steel Institute medal for that work. He is now a member of the Association of Iron and Steel Engineers and the American Iron and Steel Institute and is serving on several Technical Committees of the American Iron and Steel Institute and American Society for Testing Materials.

MR. BURNS will discuss methods of manufacturing hot and cold rolled sheets, and methods for tailoring them for specific applications. The discussion will include methods of controlling grain size and mechanical properties, the control of fluting and stretcher straining, and old and new methods of testing for drawing behavior.



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A. J. Pepin

New Developments in The Forging of Light Alloys

By A. J. Pepin

Quality and Research Engineer, Wyman-Gordon Company, Worcester, Massachusetts

MR. PEPIN graduated from Michigan College of Mining & Technology in 1932 with a B. S. in Metallurgy. In 1933 he received his M. S. from the Department of Chemical Engineering at the University of Michigan. In 1946 he completed the Advanced Management Program from the Harvard Graduate School of Business Administration. From 1934 to 1939 he was employed as Metallurgist for Wyman-Gordon Co. at Harvey, Illinois, being promoted in 1939 to Chief Metallurgist of the Worcester Division. For a year in 1947 he served as Asst. to the Vice President, and since that time has been Quality and Research Engineer in charge of Research and Production Laboratory, Inspection and Heat Treat Departments.

"NEW DEVELOPMENTS IN THE FORGING OF LIGHT ALLOYS" will be concerned primarily with large airframe and aircraft light alloy forgings made on the Wyman-Gordon 18,000 ton forging press. This forging press, located in Grafton, Mass., is the largest forging press in this country. Construction of forging presses as large as 75,000 tons capacity are now being considered. Metallurgical problems involved in forging with a press of this size will also be discussed.



Michael Field

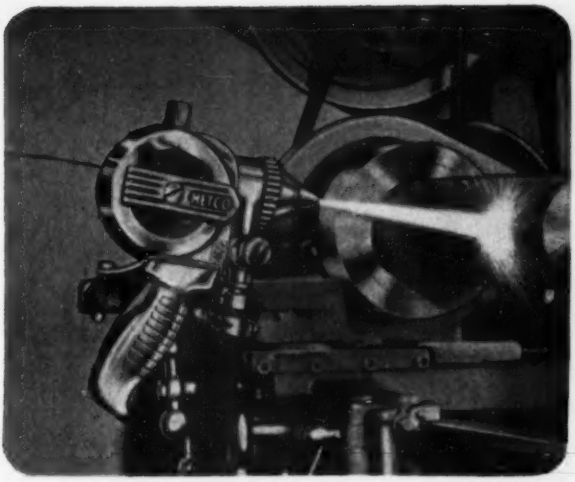
A New Approach to Machinability Through Microstructure

By Michael Field

Partner, Metcut Research Associates, Cincinnati, Ohio

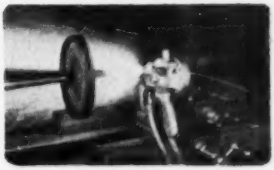
MICHAEL FIELD obtained B.M.E. from The College of the City of New York in 1937 and a M.S. degree in Mechanical Engineering from Columbia University in 1938. He was employed as research engineer in the research department at the Cincinnati Milling Machine Co. from 1938 to 1948 where he was engaged in various phases of machine tool and metal cutting developments. During that time he held a Metal Cutting Fellowship at the University of Cincinnati and received a Ph. D. degree in Physics from the university in 1940. At present Dr. Field is a partner of Metcut Research Associates, Cincinnati, Ohio.

DURING the past two years Metcut Research Associates have been cooperating with Curtiss-Wright Corporation and Ford Motor Company in carrying out a research program for the United States Air Force on the machining of a wide variety of wrought steels, cast irons and high temperature alloys. The work carried out in this project has disclosed the fact that the machining properties of metals are closely associated with their microstructure rather than their chemical or other conventional physical properties. The microstructure approach is being used by industry toward the control of machining characteristics and the prediction of more economical and more productive machining processes. Dr. Field will describe in his address the underlying relationships between microstructure and machinability of the more common steels and irons and will show how such data are applied in industry.



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A Real Opportunity for the Smaller Shop—Thousands of large, well-known companies have been metallizing users for many years, not only in maintenance but in production applications on original equipment. Now, with the development of the new L-Gun, and a low cost installation, metallizing is within the reach of even the smallest plant. (We'll be glad to send you the names of some Metco users—large and small.)

Free Bulletin or Shop Demonstration—Send off the coupon for the detailed information Bulletin 55 gives you. Or, better still, ask for a demonstration in your own shop by a Metco Field Engineer. He'll be glad to show you how the new Metco L-Gun works on some job of your own. No obligation, of course.



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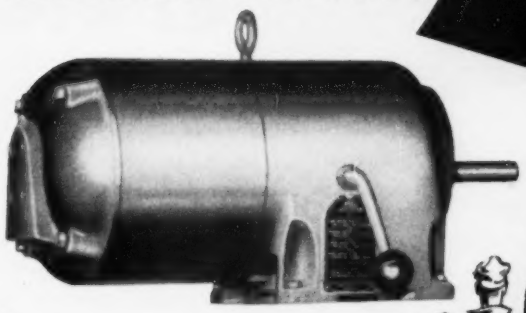
Motor built to N.E.M.A. standards; hood on wet side has splash bowl with water reservoir and settling chamber, centrifugal pump, valve and adjustable nozzle. Dry wheel guard is adjustable to wheel wear and has exhaust connection, hinged door for wheel replacement. Spindle of chrome-manganese steel on ball bearings in dustproof housings.

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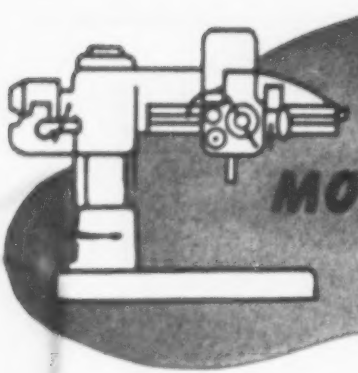
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LOST production time has been minimized at Greenville Tubes, Inc., Greenville, Pa., since the installation of the Mackintosh-Hemphill rotary straightener shown herewith. The machine is positioned on the production line between final sizing and last cutoff so that copper, stainless steel, and Inconel tubing flow from the run-out table of the unit into the cutoff machine. In an eight-hour shift, the rotary straightener does a precision job of straightening between 40,000 and 55,000 feet of tubing ranging in size from 9/32 to ½ inch. When Inconel tubing is passed between its crossed rolls, the machine operates at three-fourths rated speed or at the rate of 125 feet per minute.

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Rotary straightener used in the precision straightening of various types of metal tubing

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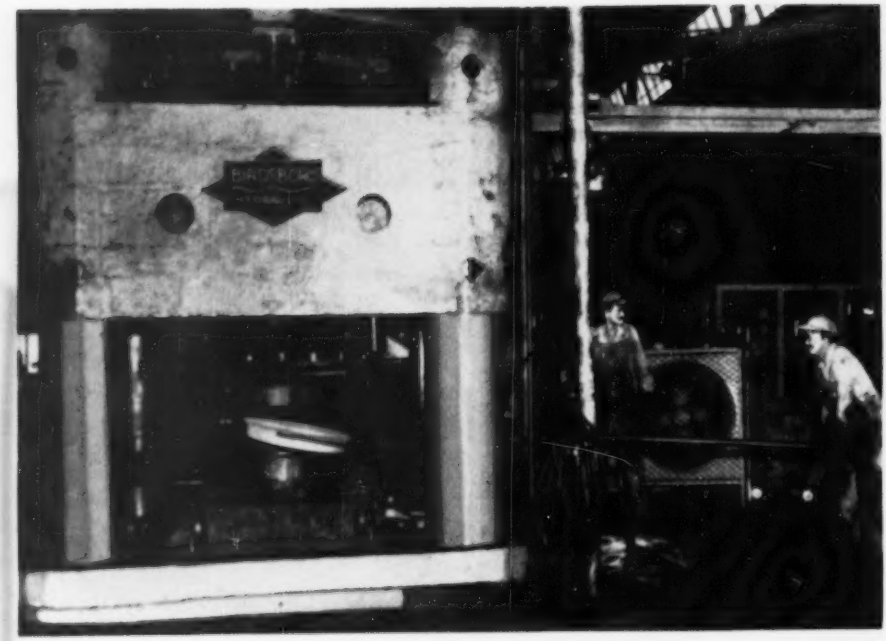
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tor. In meeting the close tolerances required by customers, Greenville Tubes has found that the straightening unit neither increases nor decreases the o.d. and i.d. of tubing. In working the metal to remove stresses created by the final sizing, precision straightening is secured and a burnishing effect on the tubing is accomplished.

Earth-Moving Equipment Parts Hot-Forged on 5,000-Ton Hydraulic Press

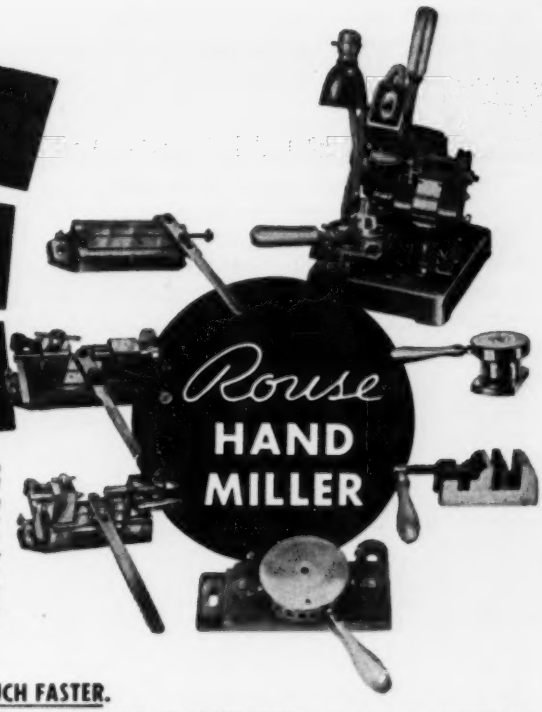
IN the Longview, Texas plant of R. G. LeTourneau, Incorporated, a 5,000-ton hydraulic press designed by Birdsboro Steel Foundry and Machine Company is now being used to produce



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hot-forged parts for earth-moving equipment. Currently, the press is being used to forge tire retainer rings for 21 x 25 tires from S. A. E. 1035 steel; axles; and other parts for large earth-moving machines.

The press is single-action, with both push-button and sensitive manual control. It is of open four-column construction, arranged for rapid advance to the work, and has a quick reversal feature which makes its operating cycle particularly adaptable for hot forging work, minimizing wear and tear on the dies by avoiding prolonged contact of the hot metal with the dies.

Liquid Blasting Cuts Die Polishing 10 Per Cent

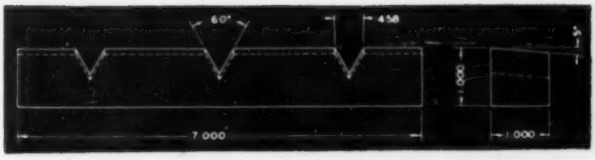
THE development of a new application of liquid blasting to remove heat-treating scale and discoloration from forging dies has reduced the time required for die polishing by 10 per cent at Rockford Drop Forge Co., Rockford, Ill. In addition, the smoother finish on the dies resulting from the application of the Hydrofinish process provides better forgings, permits closer tolerances, and reduces the tendency of the die to stick during forging, according to L. C. Olson, superintendent.

The 10 per cent reduction in the time required to clean and finish new dies results from the elimination of hand polishing for deburring and the removal of heat-treat scale and discoloration and



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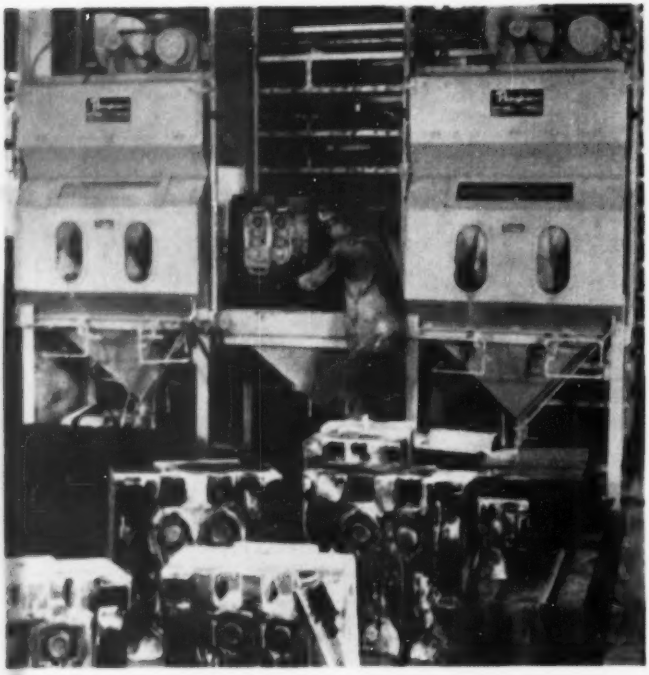
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This illustration shows the twin-cabinet Hydrofinish installation at Rockford Drop Forge Company, with a track and loading car between the cabinets. In the cabinet on the right, a coarser abrasive is used to quickly effect the bulk of the heat-treat scale removal job; and in the left-hand cabinet, a finer abrasive imparts a high finish to the dies.

for smoothing up the entire job. The method previously used required hand polishing to remove the scale and clean up the die cavity **after** heat treating, a difficult operation because of the hardness of the metal. The new method of cleaning the dies permits all fine detail work and hand polishing to be done **before** heat treating, while the metal is still soft, thus saving materially in the time required through the application of mechanized Hydrofinish cleaning methods.

Hydrofinish is the name applied to the method developed by the Pangborn Corporation for the liquid blast cleaning and finishing of dies at Rockford Drop Forge Company. In this process, the surface is blasted with a high velocity stream of non-metallic abrasive particles suspended in an aqueous solution. As the suspension is delivered to the nozzle by a circulating pump, velocity is imparted by compressed air. Particle size of the abrasive may be



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Illustration shows convex cutter for 1/4" to 2 1/2" balls.

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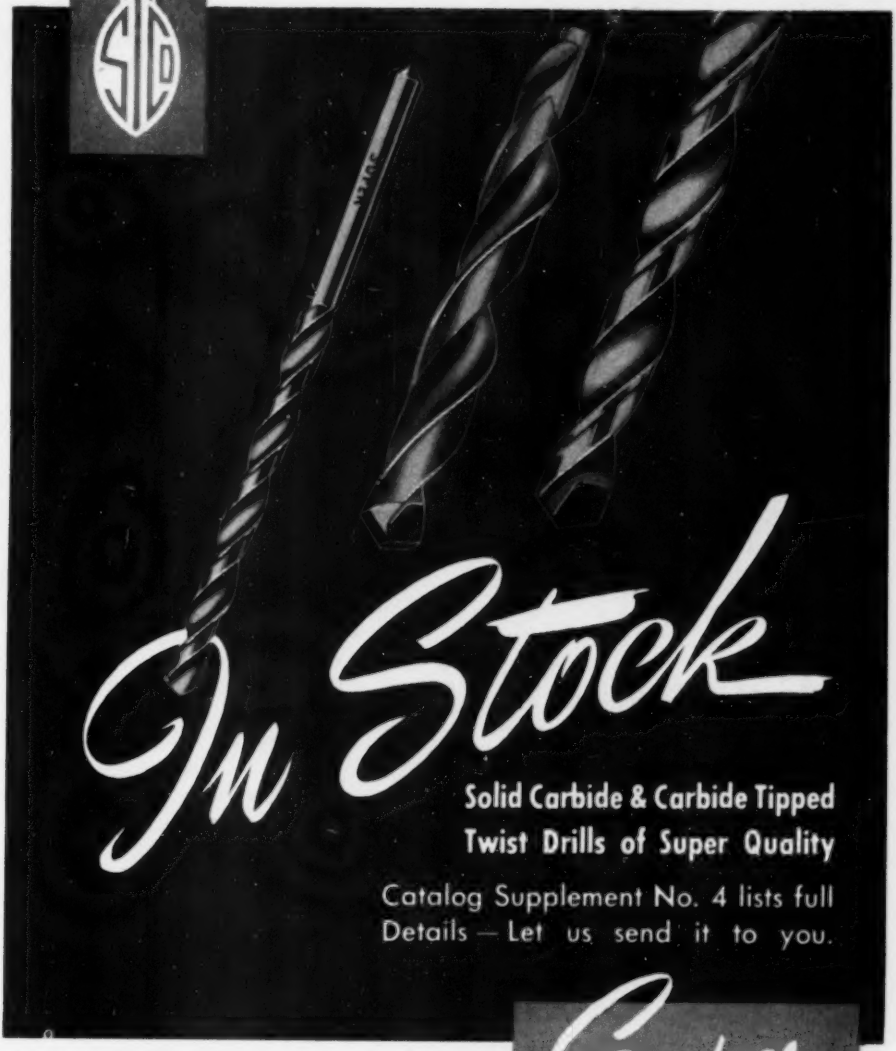
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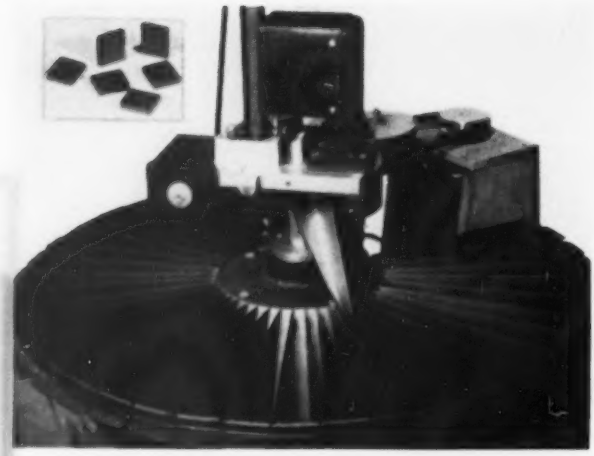
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Close-up view of gaging unit used to classify dimensions of carbon vanes (inset) for refrigerator compressors

varied from 60 mesh to 5,000 mesh equivalent. When the finer meshes are used, there is said to be no breakdown of sharp edges or corners on the pieces being polished.

Gaging Unit Classifies Precision Parts in Increments of 0.0001 Inch

A PLANT currently manufacturing refrigerator compressor units is using a Selectronic gaging unit produced by Pratt & Whitney to classify critical tolerances of carbon vanes employed in the construction of the compressor units. Through the medium of the gaging unit, a vane thickness tolerance of 0.0032 inch is allowed, with the unit automatically separating the vanes into 32 classifications in increments of 0.0001 inch.

As shown in the accompanying illustration, the vanes are loaded into a magazine-feeding mechanism from which they are automatically fed under an Electrolimit gaging head and subsequently routed into the proper classification bin. The gaging head operates a photoelectric control unit which registers the size of the vane according to its thickness and directs it to the ejection chute and then to the classification bin. As each piece is engaged, an electric impulse passes through a commutator having 32 size classification segments and thus actuates the chute-positioning mechanism.



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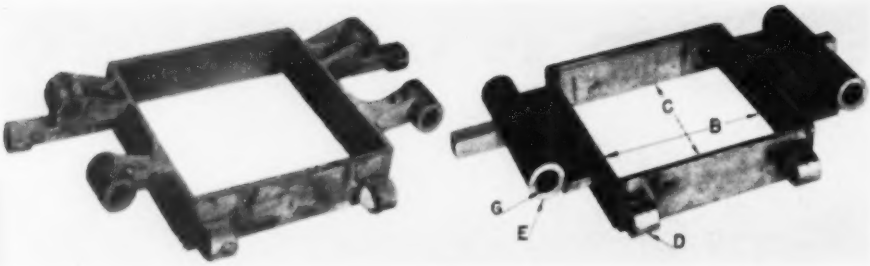


Fig. 1—(Left) Foundry sliding hopper produced by casting. (Right) Same design of hopper produced by arc welding in which machining time and costs have been greatly reduced.

Arc Welding Reduces Machining in Redesign of Foundry Equipment

BECAUSE of field failures and breakages in sliding hoppers for filling and striking off foundry mold boxes, the W. E. Dunn Mfg. Co., Holland, Mich., has redesigned this equipment for fabrication by arc welding. The illustration at the left in Fig. 1 shows the type of cast iron hopper previously used; however, because of the volume of breakages in the field, an immediate change in construction became mandatory. The design of the main frame of the machine in which the hopper was used would not allow

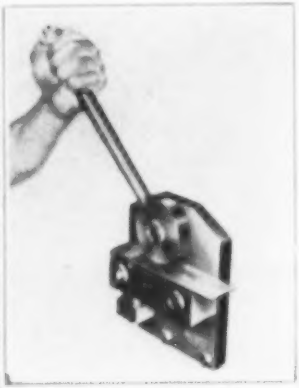
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for ribs, gussets, or pads to strengthen the arms on each end of the hopper which were breaking in use. Even though such provisions might have been made, the time required to make

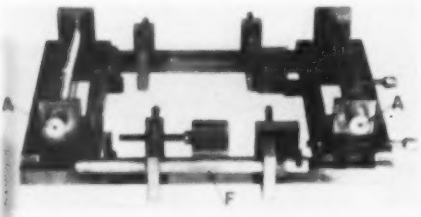


Fig. 2—Fixture used in holding hopper parts during arc welding

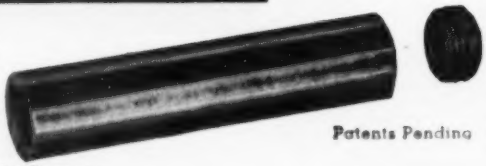
the new plate pattern would have been prohibitive. Thus, arc welded fabrication provided the solution to the problem.

The illustration at the right in Fig. 1 shows the new welded hopper. In fabricating this hopper, a fixture, of the type shown in Fig. 2, is used to locate and hold all parts accurately against machined pads by means of clamping screws, all working in the same direction to permit easy removal of the work. Designed to allow for easy access to all weld locations, the fixture includes two arbors, **A**, for use in locating the bearing tubes, **E**, of the welded hopper shown in Fig. 1. Sintered bronze bushings, **G**, are pressed into the sections of cold drawn tubing, **E**, before they are welded in position. In addition to having a high lubricant retaining capacity, these bronze bushings possess a flexibility which makes them ideal for welding. By slightly expanding the bushings axially in a vise or arbor press, the outside diameter can be increased without greatly

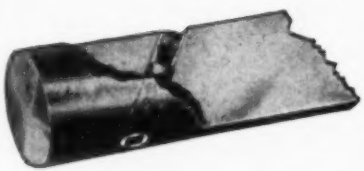
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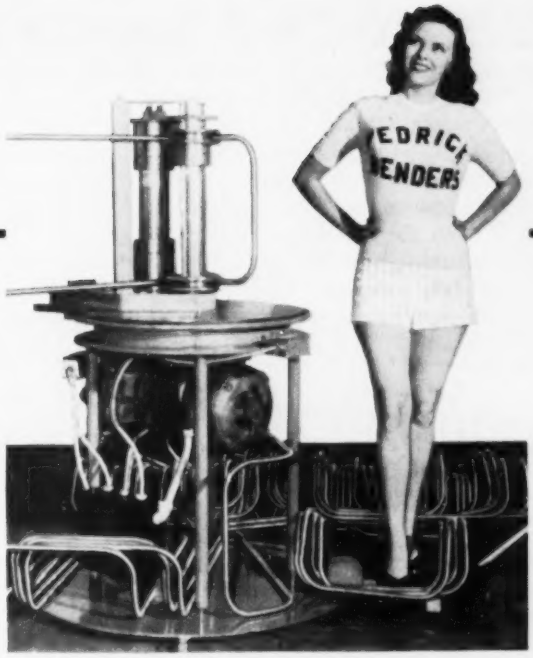


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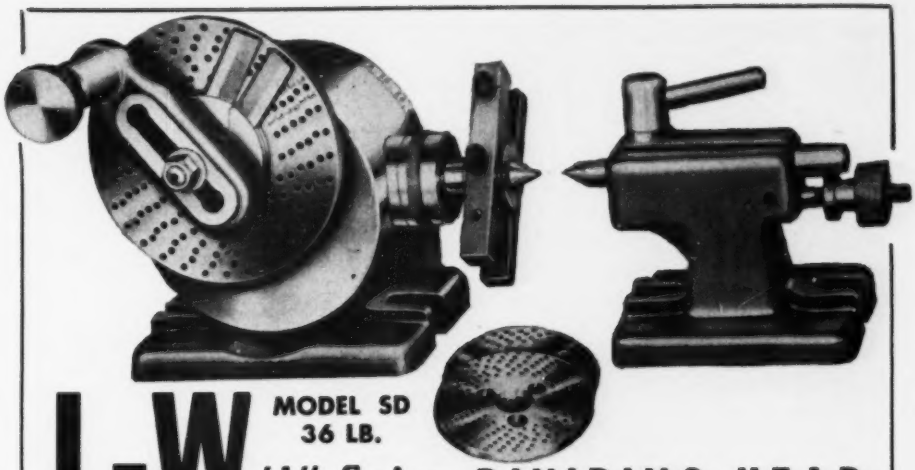
PEDRICK TOOL and MACHINE CO.
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affecting the bore size. Such an operation is sometimes required in order to adapt the bushings to the tolerances allowed in the cold drawn tubing. The bushings are 2.127 inches o.d. x 1.766 inches i.d. x 3 inches long. The arbors, **A**, in Fig. 2 are hardened and ground to a diameter of 1.763 inches and can be easily removed from the bushings after the sections of tubing have been welded in place. Shafts mounted in the block machine in which the hopper is used act as ways for feeding the hopper and are 1.750 inches in diameter. Thus, it will be observed that a maximum of 0.016 inch is provided to allow any shrinkage and warping which might occur in the bushings after the welding operation has been completed.

With the cast iron hopper previously used, the bottom had to be machined to provide for a smooth surface; however, with the arc welded hopper, the cold rolled steel pieces **B** and **C** are clamped in the welding fixture in such a manner as to provide a straight, smooth bottom for the hopper. The front bosses, **D**, of the arc welded hopper shown in Fig. 1 are properly located in the welding fixture shown in Fig. 2 by means of the shaft **F**.

By changing-over from casting to arc welding, the company has reduced machining time required in the production of hoppers by 34 per cent and has effected a savings in machining costs of approximately 50 per cent.





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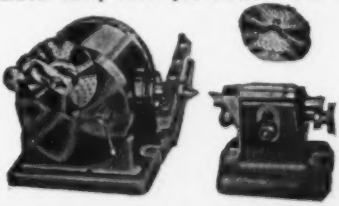
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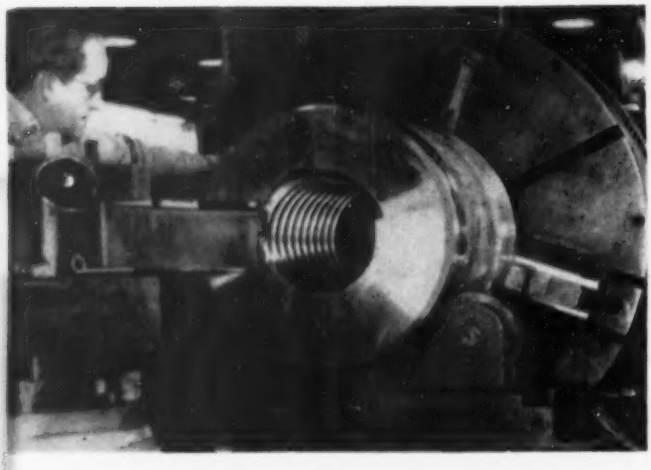
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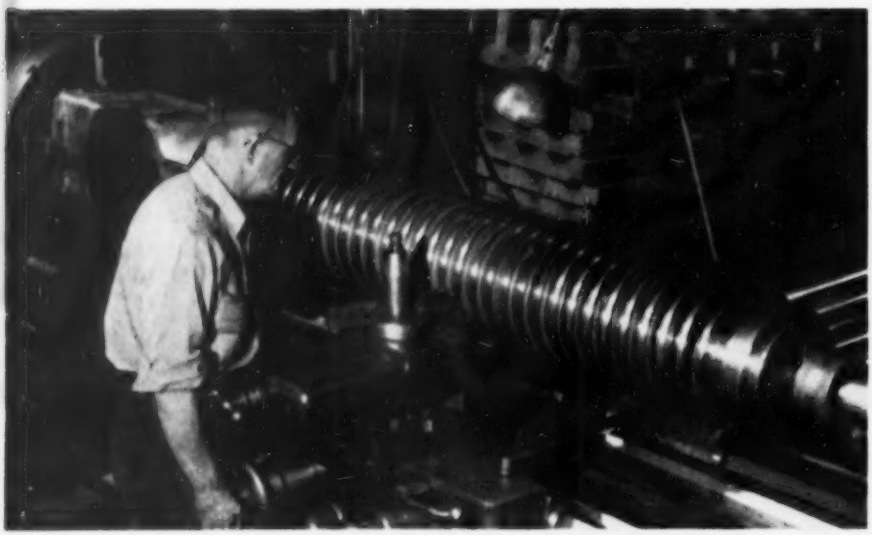


Machining one of the largest nuts ever produced by The National Supply Company at its Torrance, California plant. The nut, having threads with a 2-inch pitch, weighs 2,400 pounds.

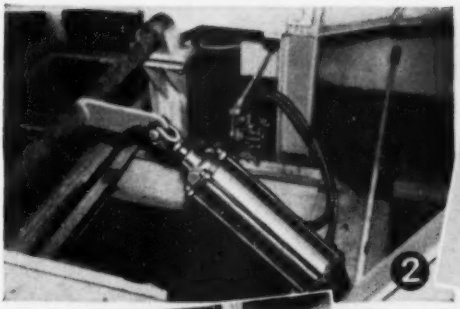
Giant Nuts and Screws Produced for Steel Rolling Mills

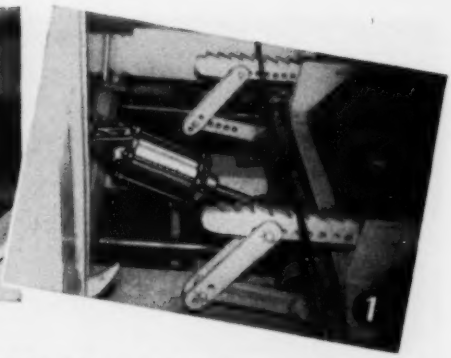
BRONZE screw nuts, each weighing 2,400 lb. and having an inside thread with a 2-inch pitch, were completed recently by the Torrance, California plant of The National Supply Company. These are the largest nuts ever produced by the company.

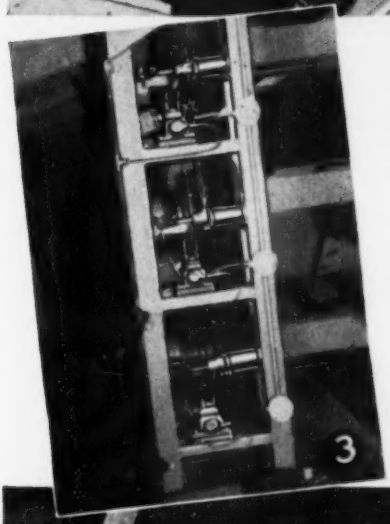
The nuts, already cast when received at Torrance, were made to fit giant housing screws which are being used to adjust the forming rolls of steel rolling mills at the Fontana, California plant of Kaiser Steel Corporation. The screws, which weigh 3,200 lb. each, were

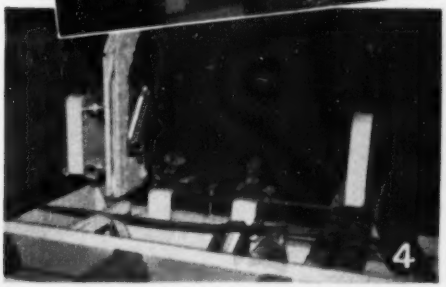


Electric furnace steel is used in this mill housing screw being turned out at The National Supply Company's Torrance, California plant. These screws, made for use in adjusting forming rolls in a West Coast steel plant, are machined to a tolerance of plus-or-minus 0.005 inch.









1. Cant Flipper actuated by NOPAK Model "E" Cylinder.
2. Log Deck Flipper-Arm Set-Up operated by 6"x18" Model "E" Cylinder controlled by NOPAK Model "R" Foot Valve.
3. NOPAK 3" x 3" Model "E" Cylinders, controlled by Model "F" Solenoid Valves, actuate clutches on Veneer Trays.
4. Saw Carriage equipped with 4" x 12" and 8" x 10" NOPAK Cylinders.

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The four applications pictured here are typical of hundreds now in operation in the lumber and wood products industries. Lifting, tilting, pushing, pulling and clamping operations are readily simplified and accelerated through proper application of NOPAK Valves and Cylinders of the correct size and type.

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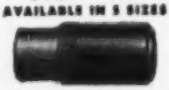
A supervisor inspects two of the 3,200-lb. housing screws made at the Torrance, California plant of The National Supply Company. The giant screws have a diameter of 12 inches and are over 8 feet long. They were made for Kaiser Steel Corporation's Fontana, California plant.

made from electric furnace steel at National Supply's Torrance plant. They are 8 feet 9½ inches long, have a 12-inch diameter, and were machined to a tolerance of plus-or-minus 0.005 inch. All forging, heat treating, and machining operations involved in the production of the screws were also performed at National Supply. A special fixture for flame hardening the threads was built for this job.

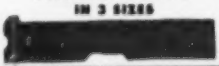
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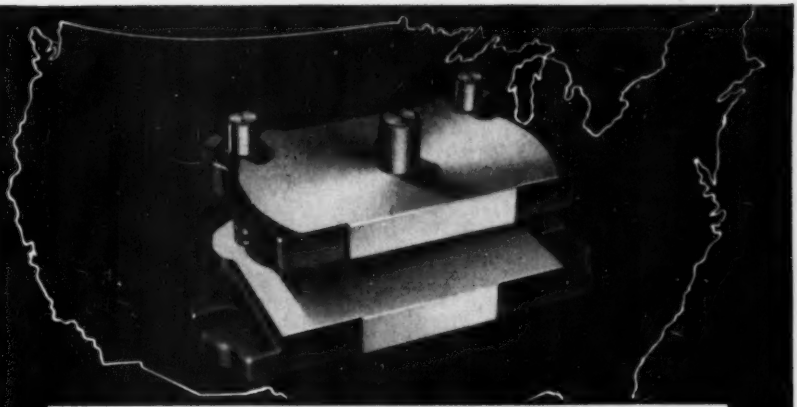


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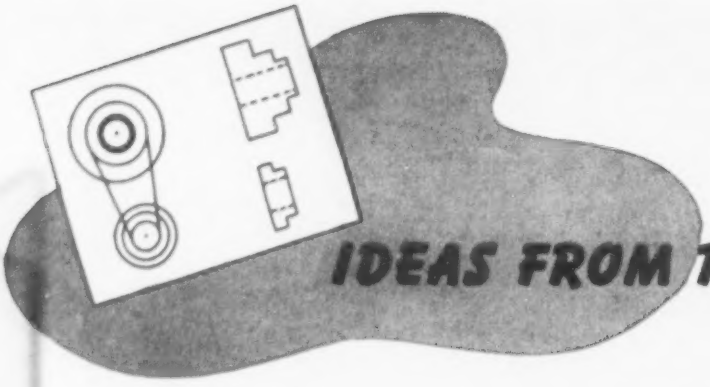
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IDEAS FROM READERS

Vibratory Tray Arrangement for Feeding Heat-Treating Furnaces

By Herbert Chase

NEARLY all fastenings made by Tinnerman Products, Inc., Cleveland, Ohio, require heat treatment. Hardening is performed in American Gas furnaces equipped with reciprocating hearths into which fastenings formerly were fed from hoppers provided with vibrators. This arrangement worked satisfactorily but had the disadvantage that tote baskets had to be lifted to a high level for emptying into the hoppers and the latter sometimes were allowed to become empty because the furnacemen could not see into the hoppers without climbing up to look over the tops.

For these reasons, large below-shoulder-height sheet metal trays, as shown in Fig. 1, have now been substituted for the hoppers, thereby enabling operators to see at all times how many parts remain in the trays, which are easily kept loaded with a minimum of lifting. Each tray is slightly inclined toward the furnace hearth and has an opening above the feed end of the latter. The central supports of the trays are short inclined leaf springs that permit the trays to be vibrated by clock-controlled Syntrons from panels of the type shown in Fig. 2 at whatever inter-

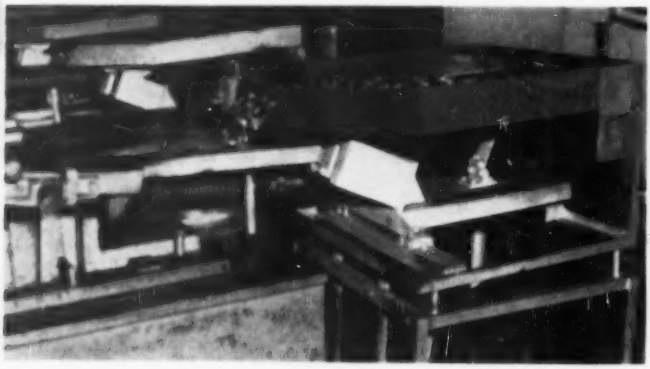


Fig. 1 — Illustration showing set of vibratory trays used to feed the reciprocating hearths at a battery of hardening furnaces in the Tinnerman plant. The rate of feed is controlled by clock-timed Syntrons and can be set as desired.

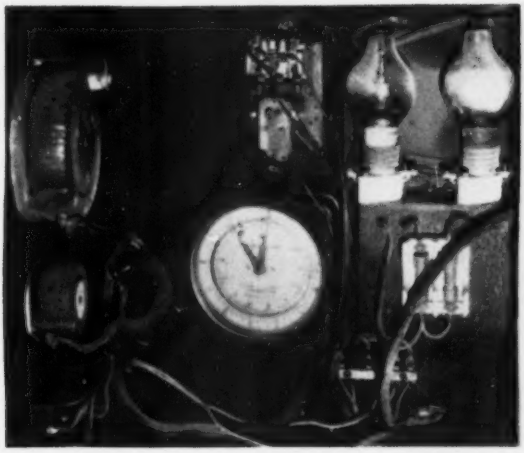


Fig. 2—View of clock and panel that control the action of the Syntron arranged to vibrate the tray that feeds parts to the furnace at set intervals.

the hopper feed arrangement, and the control clocks can be set to suit the part being fed.

Support for Cutting Circles with a Torch

By John E. Hyler

vals may be set to feed the parts at the required rate. As a result, the hearth is kept loaded with the desired distribution and never need become empty. The vibratory tray arrangement works as well as or better than

A SUPPORT for a cutting torch which makes it relatively easy to cut circles of any desired diameters from plate or to cut geometrical designs made up of circular arcs can be readily produced from a piece of flat

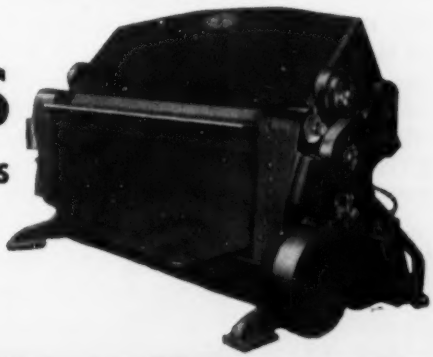
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Sketch of easy-to-make support for cutting circles with a torch

bar iron. The support shown at **A** in the accompanying sketch is representative, although it can be modified in different ways to suit requirements in a given shop. It will be noted that the bar **A** has been drilled with a number of holes on incremental spacing to accommodate the pin **D**. Where the radius to be cut is not accurately obtained by using any one of the holes in the bar, the cutting torch may be moved lengthwise in its holder a sufficient amount to compensate for the existing error. If desired, collars (not shown) may be used on the shaft of the torch to prevent any accidental longitudinal slippage while a cut is made.

The circular base plate **B**, which forms a part of the stand used to support the flat-bottomed iron bar **A**, is made sufficiently heavy to maintain its position under all ordinary conditions. If a circular blank containing a central hole is to be cut, the hole should be drilled prior to cutting the blank and a boss provided on the underside of the base plate **B** which will fit into the hole, thus automatically ensuring concentricity. The plate **B** is drilled to receive the rod **C** which is turned with a shoulder at the upper end to accommodate the plate **E** that has a hole through the center to allow passage of the pin **D** which is integral with the rod **C**. The three parts forming the composite support are joined together permanently by depositing weld metal at the point **F** and also on the underside of plate **E** against the rod **C**.


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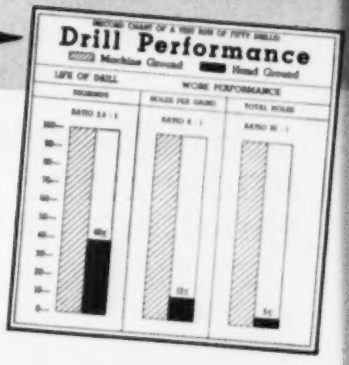
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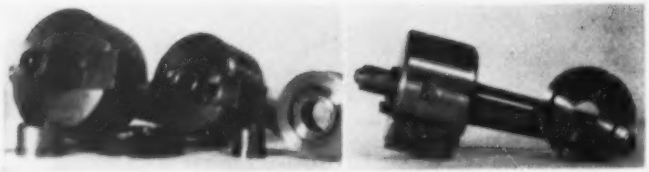


Fig. 1—Illustration showing two sizes of adjustable groove cutters together with various pilot bushings and several setting blocks. The setting blocks assure a quick setup and eliminate initial scrap.

Adjustable Groove Cutter Features Quick Adjustment

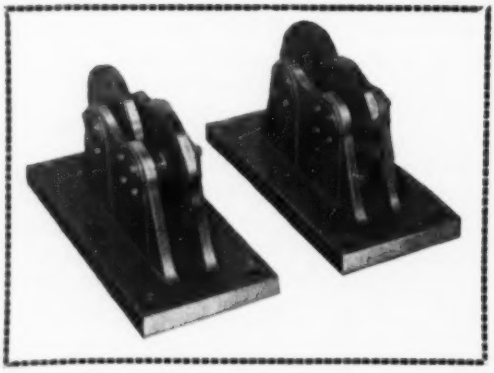
By H. G. Frommer

MANUFACTURERS of hydraulic equipment are frequently faced with the problem of machining small circular grooves into a variety of parts. Such grooves are called "O-grooves" and serve as housings for "O-rings" which, when under pressure, are effective seals.

To machine grooves of various diameters but equal widths, to speed setting up and sharpening operations, and to achieve the required accuracy of cuts, an adjustable cutter of the type shown in Figs. 1 and 2 has been found a great help to the shop. Referring to Fig. 2, the steel body **A** is provided with a Morse taper shank to permit the use of the tool in a drill press as well as a turret lathe. The body is milled and bored to accommodate the slide **B** which is rectangular on top but cylindrical at the lower half. A screw, **C**, held by a small retainer pin allows for adjustment of the slide up

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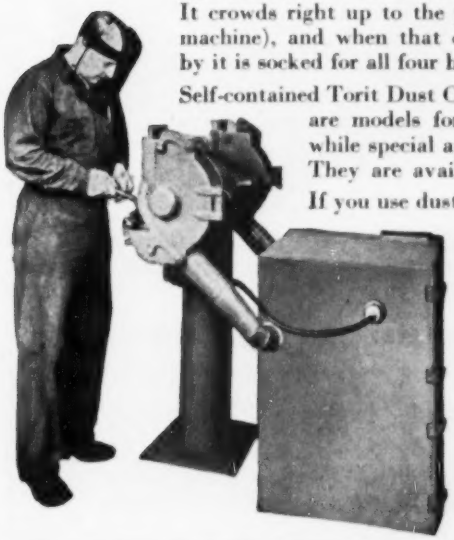
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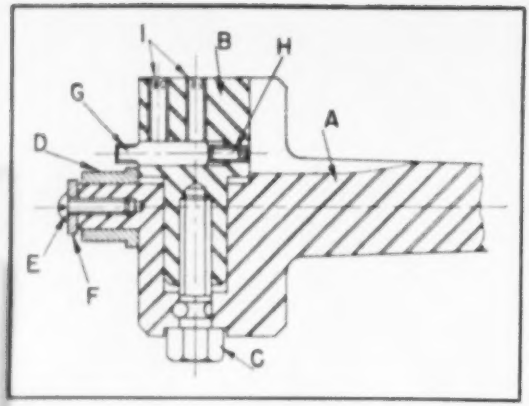


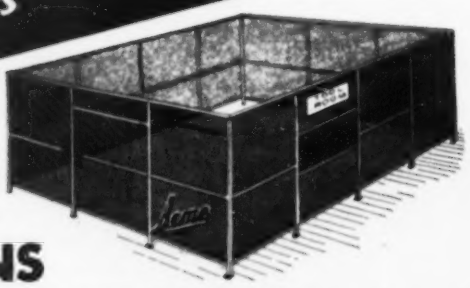
Fig. 2—Sketch of adjustable groove cutter

or down as required. A lock screw is provided to hold the slide in the desired adjusted position. (This screw is not shown in Fig. 2 but is clearly visible slightly above the slide in Fig. 1.) The front end of the body is turned to accommodate a hardened and ground shoulder bushing, **D**, which acts as a pilot. The bushing is held in place by means of a screw, **E**, and washer, **F**. The slide **B** is milled to receive the tool bit **G** which can be adjusted forward by a screw, **H**, and fastened with the aid of two screws, **I**.

Besides being adjustable over a rather extensive range, the bushing **D** can be interchanged with other bushings to allow for the use of the tool in various size pilot holes. The depth of cut is governed by the distance from the bushing shoulder to the front end of the tool bit.

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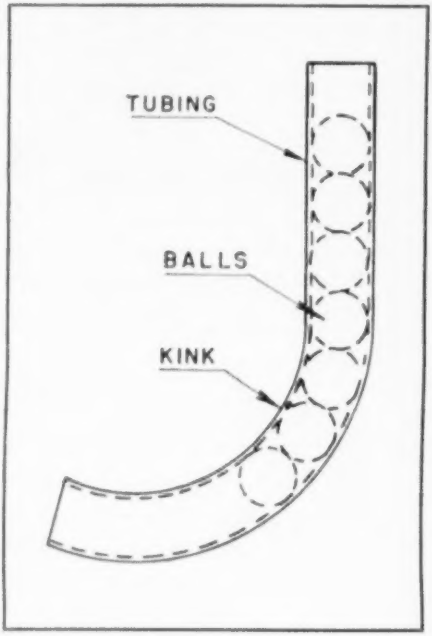
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Removing Kinks from Bent Tubing

By Irwin Mansfield

THIN walled tubing often tends to kink in bending if the bending radius used is rather small. A quick and effective method of removing the kinks is to use a number of steel balls, as shown in the accompanying illustration. The balls, which should be slightly smaller in diameter than the I.D. of the tubing, are forced through the tubing by pressing a rod against the outermost ball and gently tapping the rod with a hammer. The balls will then follow each other around the bend of the tubing, thus leaving the inside diameter of the tubing uniform in size.

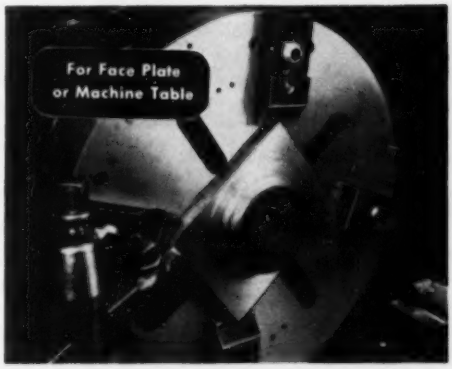


Sketch showing method of removing kinks from bent tubing

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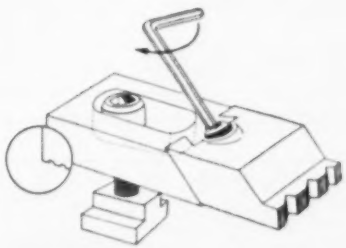
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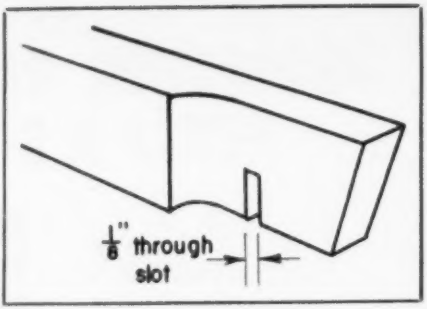
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Slot in Cutoff Tool Eliminates Chatter

By Frank M. Butrick, Jr.

RECENTLY, we experienced considerable difficulty with our cutoff tools grabbing and chattering in machining steel bar stock. We could find no looseness in the toolholder or cross slide, and the work was well supported; therefore, using a cutoff wheel, we cut a $\frac{1}{8}$-inch slot about half way through and $\frac{3}{4}$ inch from the front end of each cutoff tool, as shown in the accompanying sketch. This slot afforded the tool enough spring to prevent chatter.



Sketch of cutoff tool with through slot near front end for preventing chatter in machining operations

We found that the slotting method was also readily applicable to planer and shaper tools. A lighter cut may be necessary with the slotted tool but the finish is much better and the tool lasts longer between grinds.

For further information on any product mentioned in this issue—use the READER SERVICE CARDS between the covers.

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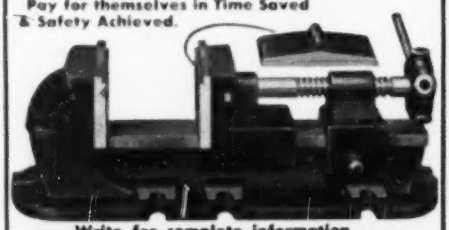
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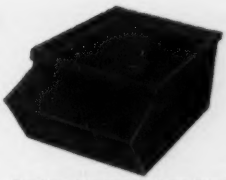
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Sterling Bin Front "Top Rim" Steel Stacking Box. Size: 18" x 12" x 6".

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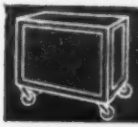
Once you use and compare Sterling stacking boxes, you'll know why we invite comparision in design, construction, and price. Our "Top Rim" construction provides stronger support all around the box . . . no corner inserts to become loose and fall out. Efficiency in designing and manufacturing allows us to quote favorably on any type or size stacking box.

Write for literature and prices.

Sterling Factory Equipment Co., 183 Charles St., Providence, R. I.

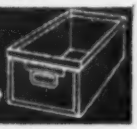


Sterling "Top Rim" Steel Stacking Box with drop handles. Size: 18" x 12" x 6".



Sterling

Quality Handling & Storage Equipment





Cut grinding costs . . . with rugged QUEEN CITY Grinders



Queen City Grinders are built to stand up under the heavy work that pours through the shop daily. Noted for their durability, freedom from downtime and low cost, Queen City Grinders cut grinding costs to the bone. • Order today a battery of these low cost grinders and eliminate "ganging up" around one lone grinder.

QUEEN CITY MACHINE TOOL CO

QUEEN CITY
Machine Tool Co.
223 E. 2nd St.,
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News of the Industry

Parker Stamp Works Purchases New York Firm

The purchase of the entire business of the Schoder & Lombard Stamp & Die Company of New York City by the Parker Stamp Works, Inc., Hartford, Conn., has been announced by Jack T F. Bitter, secretary and general manager of the Parker Company. The Schoder & Lombard Company, manufacturer of steel stamps, dies, plastic molds, and allied products, was founded in 1901 as the E. F. Hemberger Company. In 1903 the name was changed to Schoder & Lombard Engraving Company and in 1916 the company was incorporated under the present name.

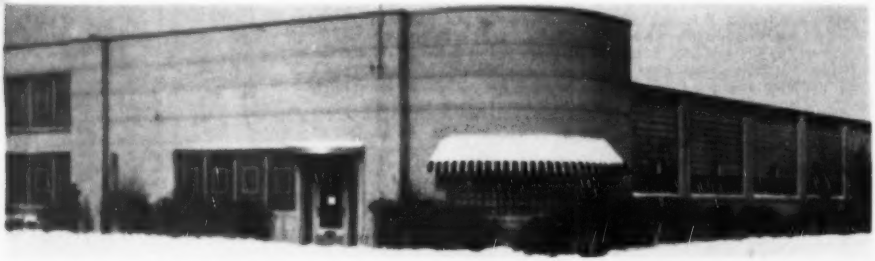
Cross Announces New Detroit Plant

The Cross Company has announced the expansion of its facilities for the manufacturing of special machine tools. A new Detroit plant, located at 9527 Traverse Ave., has added 10,000 square feet of floor space which, according to Ralph E. Cross, executive vice president, enables the firm to handle vital government contracts for special machine tools needed to produce defense material. The Traverse Avenue plant will be used for the manufacturing of small machine parts, and has been equipped with the latest precision manufacturing equipment.

In addition, new equipment has been added to the main plant of the company at 3250 Bellevue Ave. Machinery for this plant includes a large Pratt & Whitney Model 4E jig borer capable of boring to within an accuracy of millionths of an inch.

S. E. S. A. Spring Meeting

The 1951 Spring Meeting of the Society for Experimental Stress Analysis will be held at the National Bureau of Standards and the Wardman Park Hotel, Washington, D. C., on May 16, 17, and 18. Inquiries concerning the meeting should be addressed to Dr. Edward Wenk, Jr., c/o David Taylor Model Basin, Washington 7, D. C.



New Traverse Avenue plant of Cross Company, Detroit, Michigan

Twelfth Summer Management Course

The College of Engineering, State University of Iowa, has announced the Twelfth Summer Management Course which is to be held June 11 through June 23 in Iowa City. The course is an intensive one for factory managers, foremen, industrial engineers, methods and time study analysts, cost accountants, and office executives. Subjects to be covered include Production Planning, Job Evaluation, Motion and Time Study, Wage Incentives, Plant Layout, Quality Control, Supervisory Training, Labor Relations and Legislation, Organization and Policy, and Public Speaking.

The regular State University of Iowa teaching staff will be augmented by outstanding men from a variety of industries and other educational institutions. Communications concerning the course should be addressed to J. Wayne Deegan, 122 Engineering Bldg., State University of Iowa, Iowa City, Iowa.

Severance Offers Carbide Tool Regrinding Service

Since the current heavy demand for carbide products far exceeds the present available supply, Severance Tool Industries Inc., 724 Iowa St., Saginaw, Mich., is now releasing, to all those interested in carbide tooling for either defense or civilian production, a letter relative to the timeliness of conserving carbide tools, such as midget mills, rotary files, burs, countersinks, and similar tools, through the use of the company's regrinding and repairing service. It is stated that with this service, dull, broken, discarded carbide tools can be reworked so as to provide for new tool performance.

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THE *JOHNSON 706* HARDENING, TEMPERING and ANNEALING FURNACE



Select any temperature you require from 300° to 1875° F. Get clean, uniform heat at low cost. The Johnson 706 is easily regulated. Six direct jet bunsen burners have separate valves and pilot lights. Firebox 7 x 13 x 16½ lined with high temperature refractory. Counterbalanced door opens upwards.

No. 706 Pedestal (illustrated)	**$278.00**
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No. 654 with 5 x 7¾ x 13½ firebox:	
Pedestal	**$150.00**
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All Prices F.O.B. Factory. Order Now!

JOHNSON GAS APPLIANCE CO.
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JOHNSON
FURNACES FOR INDUSTRY

Cincinnati Businessmen Purchase Nebel Machine Tool Company

Charles Wm. Doepke and Frederick W. Doepke, Cincinnati businessmen, have purchased The Nebel Machine Tool Co., 52-year-old Cincinnati lathe manufacturing firm. The new owners state that the Nebel name will be retained and that the company policy of producing precision engine, gap, and extension bed gap lathes will be continued. Moreover, there will be no interruption in the sale of new Nebel lathes or service for Nebel lathes in the field, and there will be no changes in personnel.



Charles Wm. Doepke

Officers of the new management are: Charles Wm. Doepke, president; Frederick W. Doepke, vice president; Mrs. Martha Ross Frank, treasurer; and Anthony C. Reidinger, secretary. Mrs. Frank has been associated with the firm for many years as secretary to the late Fred T. Nebel, who acquired the company in 1931 and gave it its present name in 1941. Originally, the company was incorporated in Ohio as The Rahn, Mayer, Carpenter Company in 1899 and the name was later changed to Rahn-Larmon Company.

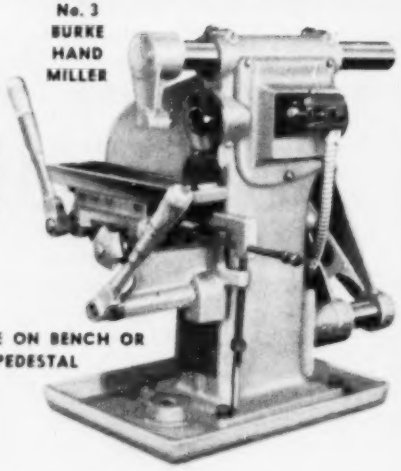
M. I. T. to Offer Summer Mechanical Engineering Courses

To review new developments in three phases of mechanical engineering, special courses in Lubrication Engineering, Metal Cutting, and Hydraulic Power Control designed particularly for engineers in industry will be given

Rugged! Rigid! Accurate! Economical!

LOW COST OPERATION HIGH PRODUCTION MILLING MACHINES

Send for circular describing various models of power and hand feed millers and attachments.



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A Division of the U. S. Burke-Machine Tool Co.
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IT'S ACORN BANDED THRUST BEARINGS



REGULAR OR SPECIAL DESIGN TO 25" O.D.

For Quality, Dependability and Price

We also make Thrust Bearings interchangeable with other manufacturers. We take in extra work on Blanchard Grinders.

Thrust Bearings Specialists For Over 30 Years

ACORN BEARING CO.

66 Stanley St. New Britain, Conn.

WHITNEY LEVER PUNCHES



No. 4 B Punch

Capacity—1/4" hole thru 1/16" steel.
Weight—3 lbs.
Punches—1/16 to 9/32 by 1/64ths.

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NEW MODEL 70

Multi-Wheel Numbering Machine

MACHINE AND SHANK ALL ONE PIECE



The most efficient method of stamping numbers into metal. Repeats the same numbers until changed. Model 70 NUMBERALL Machines are used in all industries to mark various parts. Stamps numbers, etc., quickly . . . neatly. Perfectly aligned. Much better marks are produced by these machines than by single stamps or steel type, and at a far lower cost. Shank for Hand or Press and with any number of wheels from 3 to 20.

Bulletin MS-70

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NUMBERALL STAMP & TOOL CO.

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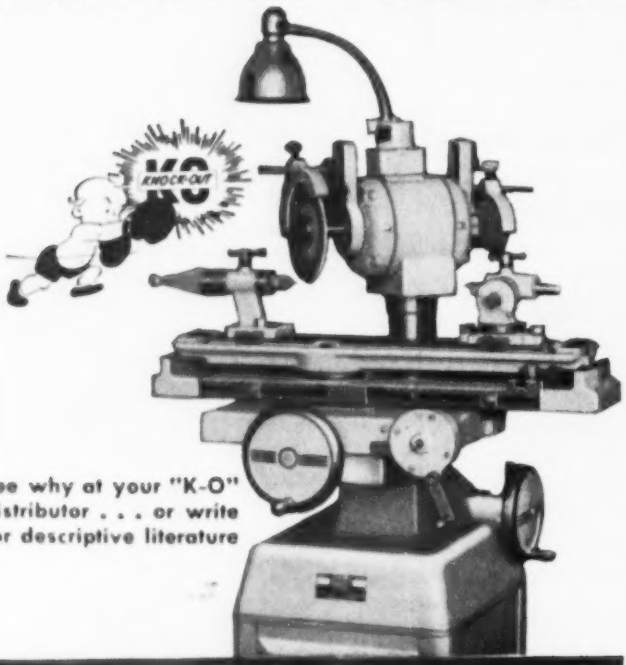
at the Massachusetts Institute of Technology during the summer of 1951. The Lubrication Engineering course, under the direction of Dr. John T. Burwell, associate professor of mechanical engineering and director of the M.I.T. Lubrication Laboratory, will be given from June 11 to June 22. It will cover the basic and special information needed by a lubrication engineer in meeting his responsibility in an industrial plant, with special reference to recent developments and their practical application.

The course in Metal Cutting, planned especially for those in industrial production, will be given from June 25 to July 6. Its emphasis will be on presenting a unified picture of the metal cutting process based on recently developed fundamental principles.

Professor John A. Hrones, director of the M.I.T. Dynamic Analysis and Control Laboratory, will be in charge of the special course in the fundamentals of Hydraulic Power Control to be held from July 9 to 20. The course will survey problems of theory and practice confronting engineers in this field, placing special emphasis on recent developments which are said to make possible greater accuracies and speeds of response.

Further information regarding the three courses may be obtained by writing to Professor Walter H. Gale, Room 3-107, Massachusetts Institute of Technolgy, Cambridge 39, Massachusetts.

There's a reason . . . 85% of all popularly-priced Tool and Cutter Grinders sold are *"Knock-outs"*



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The Standard Steel Specialty Company, a pioneer in the machine rack field, has brought an accuracy and finish to this product that cannot be matched by any other company.

This rack is made from special machinery steel finished to our specification . . . cut by expert mechanics on machines designed especially for this work.

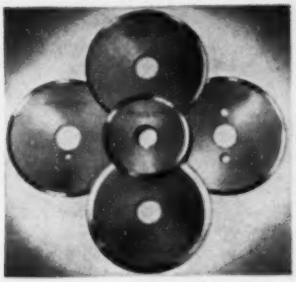
Send for our new catalog which gives information on Woodruff keys, taper pins, machine keys and features a chart for checking machine racks.

STANDARD STEEL SPECIALTY COMPANY

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PIPE *and* TUBE CUTTING

. . . More Cuts per Wheel

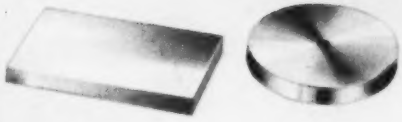
Continental Steel Cut-Off Wheels, available for all makes of rotary cut-off machines, provide increased production . . . at modest cost.

Discs 7" dia., $\frac{1}{16}$" and $\frac{1}{8}$" thick carried in stock. Bore $1\frac{7}{8}$", $1\frac{1}{3}$", or $1\frac{3}{4}$". Special sizes made quickly. *Write for folder and prices.*

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YOU'VE GOT TO BE SURE OF YOUR HARDNESS . . . INSIST ON CLARK TEST BLOCKS



Price Each: $1.50, F.O.B. Detroit

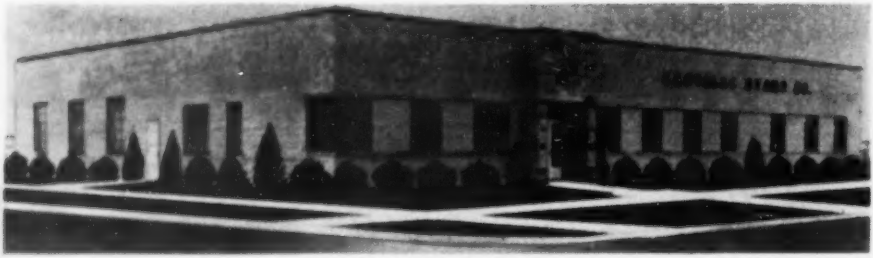
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Your hardness tester is useful only when you are sure it is giving you accurate, dependable readings. You can rely on the accuracy of your hardness tester when you check it regularly with CLARK standard test blocks. Clark test blocks, in various hardness grades, provide a quick, sure, and simple method of assuring accurate hardness tester readings.



New plant of Cadillac Stamp Co., Detroit, Michigan

Cadillac Stamp Company Now in New Plant

Completion of a new and larger plant to meet expanding needs for increased productive capacity has been announced by the Cadillac Stamp Company, manufacturer of marking equipment. The company is now occupying the new plant, which is located at 17315 Ryan Road, Detroit 12, Michigan, and is provided throughout with the most modern type of equipment.

The company offers complete engineering facilities for designing, developing, and building special equipment for all marking applications. Marking equipment manufactured by Cadillac includes steel stamps, type holders and type, machine stamps, hobs, molds, embossing dies, and hand, electric, hydraulic, and pneumatic marking machines.

for greater RIGIDITY more ACCURATE cuts



A full line of adjustable boring heads and bars now available. Heads 1½" to 7" dia. Carbide or high speed bars ⅜" to 1¼" dia. Lead screws ground AFTER HARDENING. Ample bearing surface, heat treated parts, interchangeable shanks. Criterion tools are the criterion. Write for free catalog and costs.

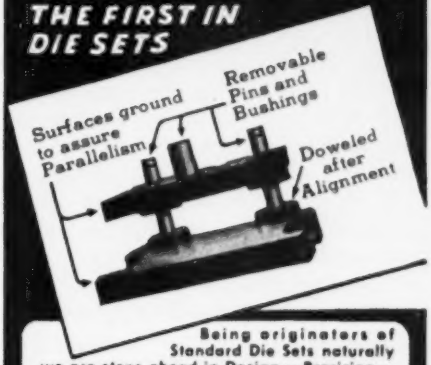
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Being originators of Standard Die Sets naturally we are steps ahead in Design — Precision — Dependability and Economy. Baumbach Die Sets can be disassembled. The Leader Pins and Bushings can be used on other size Die Sets — reducing inventorying a lot of Die Sets. Costly machining time is also reduced.

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Hammond WET or DRY



Model WD-10 Wet or Dry 10" Carbide Tool Grinder.

CARBIDE TOOL GRINDERS

HAMMOND Carbide Tool Grinders will soon pay for themselves through greater wheel economy, longer tool life and faster grinding.

AMERICA'S MOST COMPLETE LINE.

6", 7", 10", 14" Wet or Dry—also Chip Breaker and Diamond Finishing Grinders.

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CONTINUOUS OIL GROOVING

WICACO CONTINUOUS OIL GROOVER cuts grooves of all descriptions, internal or external, continuous or intermittent.

Send us samples for grooving. We will return them cut to specifications, with a record of time and cost estimate. No obligation.

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WAYNE JUNCTION, PHILA. 44, PA.

Manufacturers of
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Roller Bearing Twister Spindles—Spindle Oiling Machine
Precision Internal Grinder — Screw Machine Products.

$2,800,000 Plant Expansion Program Launched by Carboloy

A $2,8000,000 plant expansion program to meet the rapidly increasing demand, under the defense program, for tungsten carbides in various forms has been launched by the Carboloy Company, Incorporated. Of the total, approximately $800,000 is being devoted to expanding the present Carboloy plants on 8 Mile Rd., Detroit, while $2,000,000 is for the construction and equipping of a new plant in Edmore, Michigan.

The Detroit expansion will provide approximately 13,000 square feet of additional production area, plus increased facilities for the manufacture and storage of hydrogen used in the sintering of metallic carbides. The productive area of the new Edmore plant will be approximately 45,000 square feet and will provide employment for approximately 200 persons when completed. The new plant will have complete facilities for processing tungsten carbide from powder (tungsten, carbon, and so on) to finish products.

New Heat-Treating Furnace Installed by Marshall Steel Company

Marshall Steel Co., McCook, Ill., has recently completed the installation of a new 84-inch hearth heat-treating furnace of 8,000-lb. capacity to expand and facilitate service to its clientele. The new furnace will be used for the spherodize annealing of the tool steel used for the company's "Aristocrat" line of ground flat stock, as well as general heat treating. The company's own levelers were included in the installation.

DUAL CROSS and ROTARY FEED

PALMGREN Rotary, Index MILLING TABLE

No. 83 Only $49.50



Has 8" table, 360° movement and 4" cross feed travel. Adjusting wheels and dials graduated in degrees and thousandths. Slotted for bolting to table. No. 82 without rotary feed $39.75. *Write for Circular No. 354.*

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Heavy Duty • Bench Type
ENGRAVING MACHINE

Interchangeable heads for engraving, electrical marking, and acid etching . . . available for all models. Also Panto engraving cutters, cutter grinders, master copy type, endless belts and accessories.

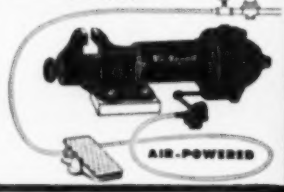


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SEVERAL OTHER MODELS AVAILABLE

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AIR-POWERED

FAST
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"TOOLMAKER'S" GUIDE



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George P. Extrom Elected Treasurer of Gisholt Machine Company

The Gisholt Machine Co., Madison 10, Wis., manufacturer of turret and automatic lathes, balancing machines, superfinishers, and special machines, has announced the election of George P. Extrom as treasurer of the company. Mr. Extrom has been with Gisholt for nearly 35 years and has been acting as assistant secretary for the past 10 years. His new duties are being assumed immediately.



George P. Extrom

Independent Pneumatic Tool Company Acquires Large English Firm

The purchase of Armstrong-Whitworth and Co., Pneumatic Tools, Ltd., Gateshead-on-Tyne, England, by the Independent Pneumatic Tool Co., Aurora, Ill., manufacturer of Thor portable power tools, has been announced by Neil C. Hurley, Jr., Thor president. Armstrong-Whitworth and its large Close works section in Gateshead with a staff of 750 employees now becomes an affiliate of Independent Pneumatic Tool Co., Ltd., London, England, a subsidiary of the parent company.

Mr. Hurley has announced that Robert G. Faverty, former manager of Thor branches in Chicago and Detroit, has arrived in Gateshead to assume immediately the position of managing director in charge of the

At last! A LOW COST AUTOMATIC No Snatch Horizontal STOCK REEL

THE JACO REEL

Rotates at just the speed to suit punch press feed. No power needed. Stock is taken from center of coil which lies on turntable. Natural spring of uncoiling material develops torque sufficient to rotate the 30" diam. ball bearing mounted platen. Will handle practically any resilient coiled material up to 6" wide. WRITE Today for Details

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JACO DEVICES, Inc., 102 High Street, Hingham, Mass.



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MARK IRON, STEEL and CARBIDES



THE Etchograph WAY

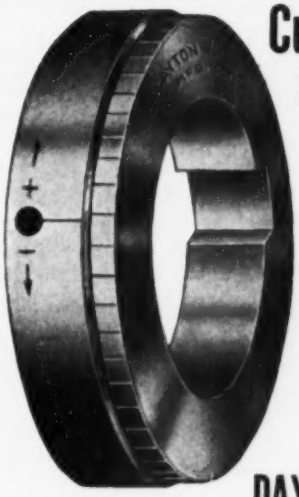
Original Electric Etcher. Thousands in Daily Use

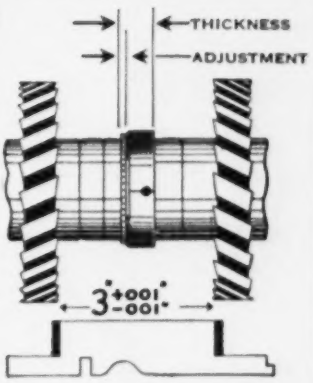
Mark *hardened parts*, tools, dies, gages and fixtures of any ferrous metals including the hardest alloys and carbides — quickly — plainly. • Three sizes to meet all requirements.

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ACCURATE SPACING of Milling Machine Gang Cutters with Micrometer Adjustable Spacing Collars





Designed for accurate spacing of side milling cutters, gang milling and other multiple milling setups.

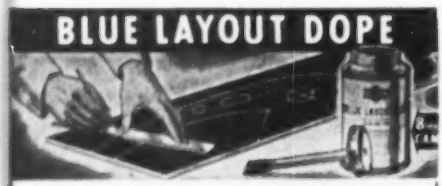
Collar may be adjusted by thousandths by merely loosening cutter arbor nut. Also quarter - thousandths adjustments.

WRITE FOR DETAILS

DAYTON ROGERS MFG. CO., MINNEAPOLIS, MINNESOTA

new Thor property. Also in Gateshead to lay out plans for an early expansion of the pneumatic tool works are E. R. Wyler, Thor vice president and director of exports, and James A. Perham, chief engineer in Thor's Aurora works. Mr. Perham is also planning with Armstrong engineers certain pneumatic tools to be produced in England.

The Armstrong-Whitworth name will be retained under the new ownership. The only other change in organization of the affiliate in addition to Mr. Faverty's appointment as managing director is the naming of William Scott as chairman of the board. Mr. Scott is managing director of Jarvis Industries Group which comprises all Armstrong-Whitworth divisions.





E. Horton and Son Company Celebrates 100th Anniversary

The E. Horton & Son Co., Windsor Locks, Conn., lathe chuck manufacturer, is now celebrating its 100th anniversary. Founded in 1851 by Eli Horton, the company began first by producing universal chucks and soon after a variety of two, three, and four-jaw chucks. Today, the company manufactures a variety of chucks, including four-jaw independent chucks, faceplate and boring mill jaws, scroll universal chucks, three and four-jaw scroll combination chucks, and two-jaw lathe chucks.

Present officers of the company are Donald B. Huntting, president; Douglas H. Thomson, Jr., vice president; and M. A. Caffery, secretary. In 1949 the company acquired the Gabb Manufacturing Company as a special products division of Horton. R. S. Cooper, also vice president of Horton, is general manager of this division.



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4" ABRASIVE BELT GRINDER

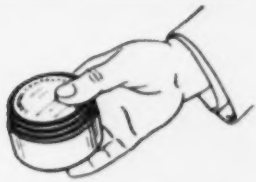
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E. K. Morgan Heads Danly Mechanical Press Sales

Danly Machine Specialties, Inc., Chicago, Ill., has announced the appointment of Everett K. Morgan as general sales manager of its mechanical press line. Mr. Morgan was formerly associated with the Giddings & Lewis Machine Tool Co., Fond du Lac, Wis., and during the years 1937-1951 served that concern as vice president in charge of sales and manager of engineering.



Everett K. Morgan

In 1913, Mr. Morgan received his B.S. in mechanical engineering from the University of Wisconsin and, after leaving school, went to work for the Rockford Drilling Machine Company, a division of the Borg-Warner Corporation, where he was general superintendent. In 1922, he became associated with the Ingersoll Milling Machine Co., Rockford, Ill., where he developed a line of production boring and drilling machines and, in 1927, was placed in charge of all sales and sales engineering.

Allied Products Corporation Acquires Michigan Powdered Metal Products Company

The Allied Products Corp., Detroit, Mich., has acquired all of the outstanding stock of the Michigan Powdered Metal Products Co., Northville, Mich., according to an announcement by Ralph Hubbart, Allied's president, and



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SAWS	⅛"-1¼"	⅛"-1¼"	⅛"-¾"

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Special reaming problems invited

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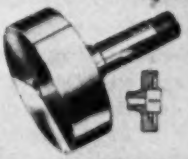
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480 (AC-50)

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LEVER-TYPE DRAWBAR ½" cap.



Positive grip on undersize, oversize or standard diameter work! Patented coordinate cams eliminate fingers.

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KASSON Precision

KASSON Precision products are guaranteed unconditionally for accuracy, fit and long life. Your dealer should have them . . . Write us for literature!

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John Haller, M.P.M.P.'s former president and founder. As a result, the Northville company becomes a wholly-owned subsidiary of Allied Products Corporation.

In the corporate structure, Mr. Hubbart will be president of Michigan Powdered Metal Products Company, Incorporated. Leroy E. O'Dell has been named vice president and will be located in Northville where he will have direct charge of the firm's operations. Mr. Haller will continue to be active in the organization as a vice president and will devote his entire time to research engineering, product development, and the supervision of production processes.

Frank H. Bishop, on the executive staff of Allied as a vice president, is also a vice president of M.P.M.P. He presently coordinates all Allied operations and will extend his activities to include M.P. M.P. operations. W. E. Ray is secretary and J. P. Halm is treasurer, both positions presently held by the two men in Allied Products Corporation. Messrs. Bishop, Haller, Hubbart, O'Dell, and Ray will comprise the board of directors of Michigan Powdered Metal Products Company.

With the acquisition of facilities for manufacturing powdered metal products, Allied enlarges the scope of its production of metal parts, which includes the manufacture of hardened and precision ground parts and cold



LOCKJAW



All-purpose work clamps Now in two Sizes!

Set-ups stay put when Lockjaw grips with both downwards and sideways pressure . . . grip is sure, powerful, self-locking . . . eliminates cumbersome bolting and clamping . . . saves time and work spoilage. Use Lockjaw on planers, radial drills, shapers, milling machines, surface grinders, boring mills and lathes.

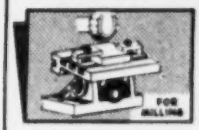
Two sizes: Model B for large tables. Lighter Model A where table space is limited. Interchangeable jaws to fit work contours.

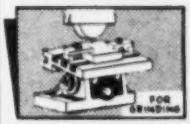
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Brighton 35, Boston, Mass.
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For More Precision Work
RELY ON RIVETT, The Master Craftsman's Master Tools

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QUICKLY SET-UP FOR ANY ANGLE BETWEEN 0°&90°

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forged parts. In its various plants, Allied also produces sheet metal dies, precision-cast dies, and interchangeable punches and dies.

Steel Founders' Society Names Winners in $1,000 Design Award Competition

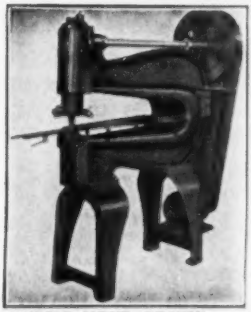
The increasing use of steel castings to meet complex engineering, design, manufacturing, and sales requirements in virtually all basic industries is emphasized in results of the international design awards program sponsored by Steel Founders' Society of America. Heading the list of winners was George Habian, engineer for Western Electric Co., Inc., New York. His paper and accompanying ingenious designs of cable reel saddle steel castings used on a cable meauring machine were accorded first honors by the judges and the top award of $300.

Recipient of the second place award of $200 was Charles L. Babb, engineer in charge of design, centrifugal pump department, Allis-Chalmers Mfg. Co., Milwaukee. Mr. Babb's steel casting designs for outer barrel and suction nozzle ends for a high pressure multi-stage centrifugal pump used for boiler feed work in power stations were considered exceptional.

Winner of the third place award of $100 was Leonard G. Daniels, research metallurgist, Thompson Products, Inc., Euclid, Ohio, who was a member of the Precision Metalsmiths, Inc. organization at the time of filing



SAVAGE
NIBBLING MACHINES



CAPACITY
¾" MILD
STEEL

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STERLING DRILL GRINDER



CAPACITY:
3/16" to 2½" drills.
5" x 9" adjustable table.

MOTOR: ½ hp,
3450 rpm.

NET WT: 250 lbs.

CRATED: 320 lbs.

McDONOUGH MANUFACTURING CO.
EAU CLAIRE, WISCONSIN, U. S. A.



"Keep cool everybody! Emil has a grip like a JACOBS CHUCK!"

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JACOBS
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GK KNIFE GRINDER

For finer, longer lasting cutting edges than you thought possible—by the most rugged machine in its range—up to 120" and longer!

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Straight or Cylinder Wheel Type with Either Mechanical or Hydraulic Control

COVEL SAW SHARPENERS HANCHETT KNIFE GRINDERS

HANCHETT MANUFACTURING CO.

Main Office—Big Rapids, Mich. West Coast—Portland, Ore.

World's Largest Manufacturers of Saw Sharpening and Knife Grinding Machinery

his entry. Mr. Daniels submitted an original design for production of an aviation selector valve cylinder entailing conversion from welded assembly to steel investment casting.

Others earning distinction for outstanding design papers and designation for $50 or $25 awards were as follows: (Fourth) L. N. Tangeman, project engineer, Dempster Mill Mfg. Co., Beatrice, Neb.; (Fifth) Orrin F. Arnold, purchasing agent and cost accountant, Bacon Vulcanizer Mfg. Co., Oakland, Calif.; (Sixth) Joseph E. Cruse, president and chief engineer, Continental Farm Equipment Co., Omaha, Neb.; (Seventh) Robert E. Greenawalt, engineer, Salem-Brosius, Inc., (formerly Salem Engineering Co.), Salem, Ohio; (Eighth) Leo A. Chartier, Wilson Trailer Co., Sioux City, Iowa; (Ninth) J. C. King, development engineer, Brown Instruments Division, Minneapolis-Honeywell Regulator Co., Philadelphia; (Tenth) Theodore Cackowski, mechanical draftsman, Truscon Steel Co., Youngstown, Ohio; (Eleventh) Loy D. Rhoads, chief engineer, The General Excavator Co., Marion, Ohio; (Twelfth) H. W. Gunther, engineer, Paris, France.

Heller Brothers Announces Personnel Changes in Sales Areas

Lloyd C. Smith, vice president in charge of sales, Heller Brothers Co., Newcomerstown, Ohio, manufacturer of files, hammers, and other hand tools, has announced that Albert M. Thomas has been promoted to the Chicago territory and will also supervise the territory consisting of Wisconsin, Iowa, Nebraska, Minnesota, North Dakota, South Dakota, Missouri, Arkansas, Oklahoma, and Kansas. Rudy F. Gerdelman has been promoted to the position of salesman

RIVETING?

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FAST RIVETING
WITHOUT NOISE



Put your production jobs on Linley Spinner Type Riveting Machines. No hammering! They spin rivet with twin rollers. In most cases the actual riveting time is one second per rivet, so that you can watch costs come down while noise is entirely eliminated! Direct Motor or Vee-Belt Driven. Bench or floor types.

Send samples of your work for free riveting, cost of equipment and true estimate on production.

LINLEY BROTHERS CO.

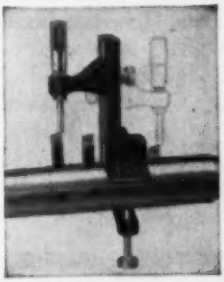
671 STATE ST. EXT. BRIDGEPORT 1, CONN.

SAVE TIME

With

Bartelt

Gages



• Use a Bartelt Pedestal Micrometer for setting boring tools and for many other shop operations requiring accurate positioning relative to a fixed base. Make settings in one step — eliminate cut-and-try-methods. Model B, with reversible slide, shown. *Write for literature describing all models.*

BARTELT ENGINEERING CO.

1216 PARTRIDGE AVE.

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HART MILLING FIXTURES

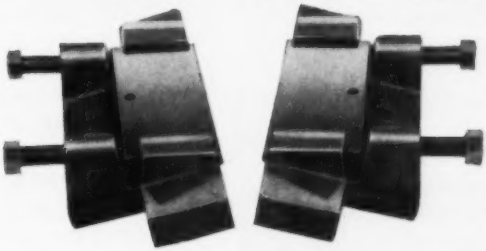


"Masters of 1000 Set-ups"

Little need for Expensive Jigs or Fixtures

These fixtures make themselves popular and profitable in any shop—are used in either horizontal or vertical position. Suitable to hold round hexagonal, octagonal, or square stock, aligning the work with the machine. Grip holds the work on the bottom as well as on the back. Generally sold in pairs. Made in 4 sizes — to hold stock from ½ to 5 inches.

HART MACHINE VISE JAWS



These Jaws are very useful on any machine table. They clamp or bolt to the table, the angles firmly holding the work down. Each hardened tool steel jaw measures 3"x6"x½". The angle edges are serrated.

Write for illustrated folder & prices.
We also manufacture Hart Index Centers.

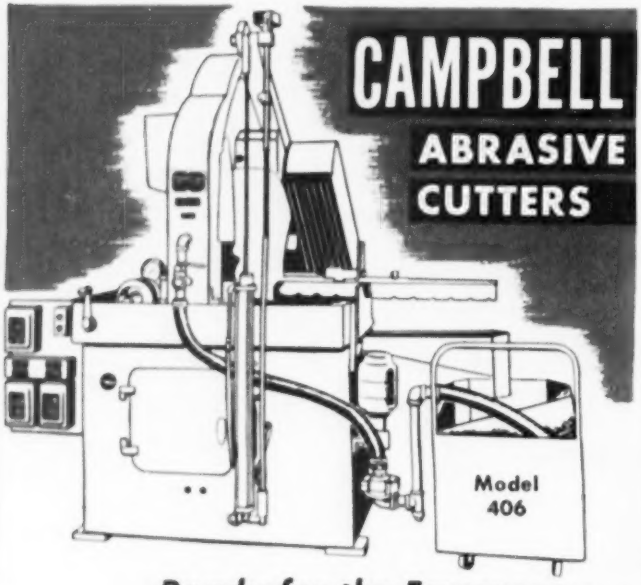
Hart Machine Co.

26 Mather St. Dorchester, Mass.

covering Missouri, Arkansas, Oklahoma, and Kansas. Mr. Gerdelman formerly covered this same territory for Heller Brothers as a service engineer.

Jack Haas has been employed by the company as a salesman in the Minnesota, North Dakota, South Dakota, Iowa, and Nebraska territory. Mr. Haas was formerly buyer for the Nagell Stores of Minneapolis. J. D. Nicklis has been promoted to assistant sales manager of the company. Mr. Nicklis for many years served with Manning, Maxwell, & Moore, Inc., as vice president in charge of the mill supply department and purchasing. Maynard C. Jewell has been promoted to salesman in the territory consisting of western Pennsylvania and western New York State. Mr. Jewell has been employed by Heller Brothers as assistant foreman in its plant at Newcomerstown, Ohio, for the past 10 years.

Lester P. Evans, who has covered the Los Angeles territory, will add to his territory New Mexico, Arizona, and El Paso, Texas. Donald B. Wilson, who has covered the San Francisco territory, will add to his territory Colorado, Utah, and Nevada. William J. Hopkins, who has covered the Los Angeles territory as service engineer, has been promoted to salesman in the territory consisting of Washington, Oregon, Montana, Idaho, and Wyoming. Edgil C. Fisher, formerly a service engineer in the San Francisco, California area, has been transferred to the Los Angeles California territory as service engineer for the area.



Ready for the Emergency

• A complete line for cutting all metals—ferrous or non-ferrous—hard or soft. Re-engineered for higher production performance and lower over-all cost. Many automatic features. Cutting disc enclosed in steel guard. The safest abrasive cut-off machine made.

Write for "Campbell Explains Abrasive Cutting"

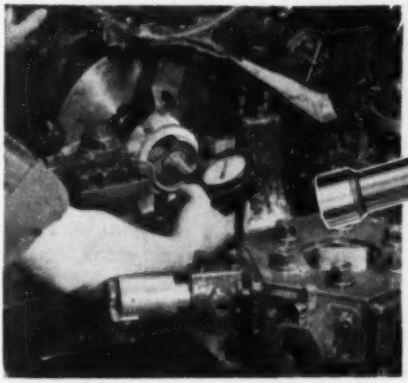
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we'll make recommendations

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AMERICAN CHAIN & CABLE
931 Connecticut Ave., Bridgeport, Conn.

Get a higher percentage of acceptable work in producing PRECISION HOLES

Amazing improvements in volume of production and precision of holes are on record as a result of giving machine operators COMTORPLUG. This unique hand gage, enables operator to keep machine adjusted better. Automatically and positively assures correct gaging to fractions of .0001". Detects out-of-round, tapers, bell mouth, etc. COMPLETELY AND POSITIVELY ACCURATE IN HANDS OF RELATIVELY UNTRAINED PERSONS — AT MACHINE OR INSPECTION LINE. Applicable to work still in chuck if desired; shows actual size—just right for Statistical Quality Control. THE Answer to war conditions, involving great urgency, green help, rough handling of gages.





⅛" to 8" and larger



COMTORPLUG *gages bores to fractions of .0001"*

REQUEST BULLETIN 40

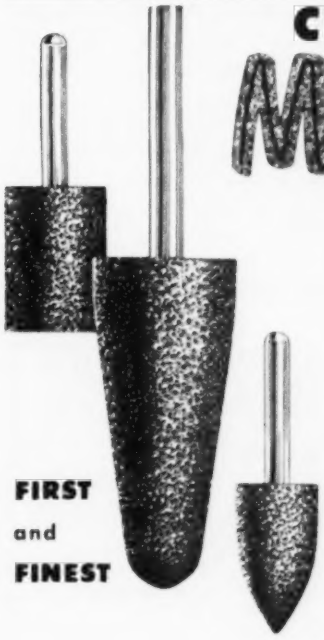
COMTOR CO. 64 FARWELL STREET WALTHAM 54, MASS.

For data on COMTORGAGE Precision External Gage, request Bulletin 30.

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10 Big Advantages



FIRST and FINEST

1. First in the Field — Unexcelled "Know-How"
2. Stronger Mandrels — Special Analysis Steel
3. Wheels Guaranteed to Remain on Mandrels
4. Constant Concentricity for Perfect Balance
5. Widest Variety of Sizes and Shapes
6. Strongest Construction for Longest Life
7. Greater Cutting Freedom — Faster Cutting Action
8. Better, Finer Finishes Positively Assured
9. Job-Engineered to Your Particular Requirements
10. Recommended by Skilled Mechanics and Craftsmen

Free Sample Wheel

Give details of your operation. We'll supply correct sample. No obligation. Write for Free Catalog.

CHICAGO WHEEL & MFG. CO.

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British Industries Fair

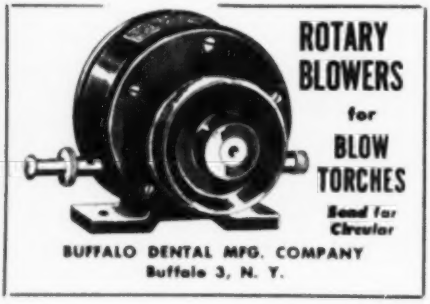
A full range of the finest products of Great Britain's engineering works will be displayed for United States industrial executives, engineers, and purchasing agents at the heavy industry exhibit in Birmingham at the forthcoming British Industries Fair to be held April 30 through May 11. According to the American Committee for the B. I. F., four hundred and eighty-nine manufacturers and producers of plant machines, equipment, and other products in the field of engineering will display their exhibits at Castle Bromwich in Birmingham where more than 500,000 square feet of indoor space and additional outdoor area will be devoted to engineering and heavy industry. These engineering exhibits will include equipment designed for use in the oil, petroleum and gas industries, metal mining, power plants, railroading, engineering construction, coal mining, marine engineering, and other industries.





New Crobalt Plant Handles Increased Volume

L. D. Burnell, president, has announced that Crobalt, Inc., manufacturer of non-ferrous cast-alloy cutting tools and wear-resistant alloys, has recently built and moved into a larger plant on a 1-acre tract at 2800 S. State St., Ann Arbor, Mich. The new building is the first of several units to be erected, and provides the space required to handle an increased volume of business resulting from improved products and production methods. It is designed and equipped for maximum efficiency in production, research and development work.



EMERY CORDS and TAPES



"The Machinist's Friend"

For Polishing And Burring Small holes, slots, dies, etc.

Useful in many ways.

Available on spools in the following sizes and grits.

No.	Diam.	Grain	No.	Diam.	Grain
49	.082	120	60	.015	200
50	.070	180	66	.012	Cro.
51	.055	120	56	3-32	180
52	.055	150	57	4-32	180
53	.040	180	58	7-32	150
54	.030	200	59	9-32	150
55	.018	200			

Write for samples and prices

E. C. MITCHELL COMPANY

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ARTUS PLASTIC SHIM



AND FEELER GAUGE STOCK

The COLOR tells the THICKNESS

Each thickness a distinctive, easy to identify color. Impervious to oil. Long lasting. 5"x20" sheets. Special sizes to order. Handy assortment, shim stock, 12 colors—12 thicknesses (.001-.030). Bound together. $4.90.

Order today. *Immediate delivery.*

INDUSTRIAL PRODUCTS SUPPLIERS

201 S. Dean St., Dept. M, Englewood, N. J.

Buy KIPP AIR GRINDERS Because

The RPM's stay up while grinding ... not only when the grinder runs idle.

It is an established fact that surface speeds must stay up to approximately a mile a minute if you want to grind — not just rub. The speed of Kipp air grinders drops but slightly when put to work. That means better work—longer wheel life.

Buy Kipp air tools for best results, lower prices.

MODEL JA
50,000 R. P. M.
$42.00
IN U. S. A.



Weight 12 ounces; length 6¾ inches; chuck size ⅛ inch. Wheel guard removed for better illustration.

MADISON-KIPP CORP.

208 Waubesa St., Madison, Wis., U.S.A.

- *Skilled in* DIE CASTING *Mechanics*
- *Experienced in* LUBRICATION *Engineering*
- *Originators of Really* High Speed AIR TOOLS

Utica Drop Forge Appoints Two New Vice Presidents

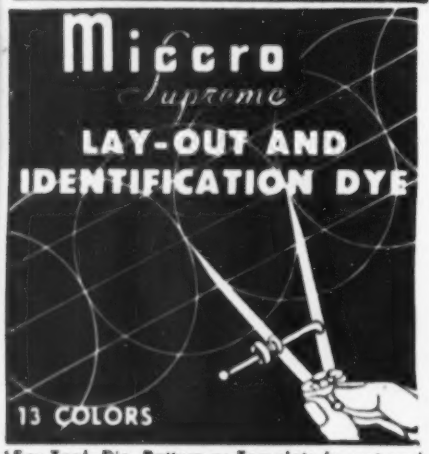
Utica Drop Forge & Tool Corp., Utica, N. Y., has announced the appointment of Charles E. Wilderman and Daniel E. Waterbury as vice presidents. An authority on precision drop forging, Mr. Wilderman came to Utica Drop Forge in 1945 as chief metallurgist. From this position he progressed to plant superintendent and to division manager prior to his appointment as vice president. For 15 years before coming to Utica, he was with U. S. Steel as a metallurgist.

Mr. Waterbury graduated from Notre Dame in 1943 with the degree of B.S. in aeronautical engineering and came to Utica Drop Forge in 1946. During much of World War II he was an officer in the U. S. Navy, specializing in aircraft engines and the maintenance and repair of aircraft. Entering Utica Drop Forge as a draftsman on precision forgings, he soon moved into the engineering division and was production control manager prior to his appointment as vice president.

Lapping Compound Available in Applicator Gun

To provide for a high degree of accuracy in the method of delivery to the individual job, Benjamin Greenfield, president of Ace Abrasive Laboratories, Inc., 250 W. 57th St., New York 19, N. Y., has announced that the company's "Star Dust" Diamond Lapping Compound, in addition to being available in ophthalmic-tipped tubes, is now also supplied in cartridges to fit a special applicator gun which is designed to deliver accurate minimum quantities of the compound without waste or contamination.





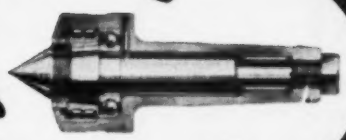
For Tool, Die, Pattern or Template layout on metal . . . Quick identification of bar stock, sheet, strips or parts . . . Shows up in sharp relief—dries instantly . . . Write for sample and circular on company letterhead.

MICHIGAN CHROME & CHEMICAL COMPANY
6340 E. Jefferson Ave. • Detroit 7, Mich.



NIELSEN

Heavy Duty Live Centers

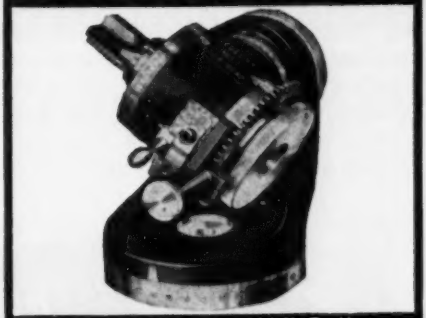


Adapted for heavy duty work. Precision type ball and roller bearings assure maximum capacity for high speed production and long service.

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NIELSEN, INC. LAWTON, MICHIGAN

TOOL HOLDER INDEXING HEADS



Hold 1/16" up to 1½" Collets 5C or 1AM Collets and Brown & Sharpe or Morse Taper. Will adjust to any compound angle.

GRINDERS & FIXTURES INC.
8329 Clinton Road Cleveland 9, Ohio

COMET

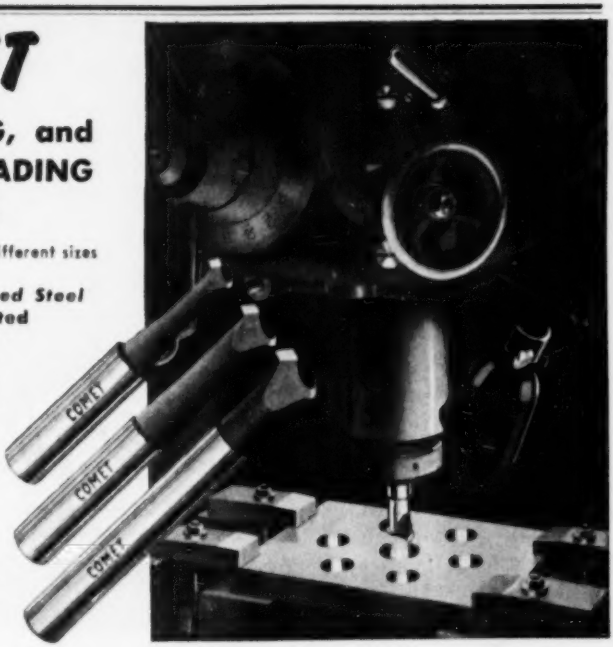
BORING, FACING, and INTERNAL THREADING TOOLS

For holes from 1/8" upward, 15 different sizes

Made of Super-High-Speed Steel
Specially Heat Treated

Indispensable for your JIG BORER. The worm-like spiral of the boring heads provides a long useful cutting surface. Their use insures perfect fitting threads. Correctly designed for precision work.

Write for complete data.



Comet Tool Co.
738 Broadway
New York 3, N. Y.

William A. Roberts Named Allis-Chalmers President

William A. Roberts, executive vice president in charge of the tractor division for Allis-Chalmers Manufacturing Company since 1947, was elected president of the company at a special meeting of the board of directors. Mr. Roberts succeeds the late Walter Geist who served as president of Allis-Chalmers from May 1942 until his death on January 29 of this year.

The board also elected four new vice presidents and made other organization changes. W. C. Johnson, formerly executive vice president in charge of the general machinery division, was named executive vice president for the entire company. J. L. Singleton, formerly vice president and director of sales, general machinery division, was named vice president in charge of the general machinery division. Fred Mackey, formerly general works manager, general machinery division, was named vice president in charge of manufacturing, general machinery division. R. S. Stevenson, formerly general sales manager, tractor division, was named vice president in charge of the tractor division. A. W. Van Hercke, formerly director of engineering, was named vice president in charge of engineering, tractor division. John Ernst, formerly general works manager, tractor division, was named vice president in charge of manufacturing, tractor division,



Meyco Carbide Inserted Drill Jig Bushings

MEYCO bushings combine the best features of steel and carbide . . . the protection of steel with the long life of carbide at the points of wear. First cost: higher; end result: substantial savings in production costs. Made to ASA standards . . . MEYCO bushings will SAVE you money. Don't miss *this* bet! Many sizes now available from stock.

User Says:

"We have a jig setup where four holes are held to a limit of plus or minus .0005" on the spacing. MEYCO bushings were put into service . . . and, after completing 150,000 parts, the bushings show no appreciable wear."





Write for bushing catalog No. 16, for further details and a price list.

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PRECISION GRINDERS

for close tolerance work

Grinder No. 1010 shown here is a rugged 130 lb. general service grinder with 36 & 60 grit 10" wheels. 3 phase, 1725 RPM motor will take plenty of overload and abuse. Will not burn out. Balanced wheels, dynamically balanced armature. Wide clearance between wheels and motor frame allows working on large or odd-shaped pieces.

$117.00

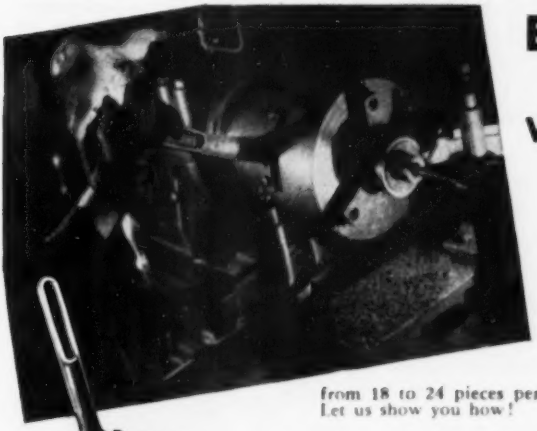


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BALDOR ELECTRIC COMPANY

Motors - Grinders - Battery Chargers

4380 Duncan Ave., St. Louis 10, Mo.



BARKER

(Two-Jaw or Three-Jaw)

WRENCHLESS CHUCK

will pay for itself in 60 to 90 days on production schedules by giving MORE parts per hour at a LOWER cost per part. Most round parts can be set in the Barker Wrenchless Chuck without stopping the machine. It saves time, helps speed up production, and cuts spoilage where the run is continuous on turrets, engine lathes, cutting off machines, drill presses or any other type of chucking machine. The Barker Chuck shown here, replacing an ordinary 3-jaw chuck, jumped production from 18 to 24 pieces per hour. It can do it in *your* plant too. Let us show you how!

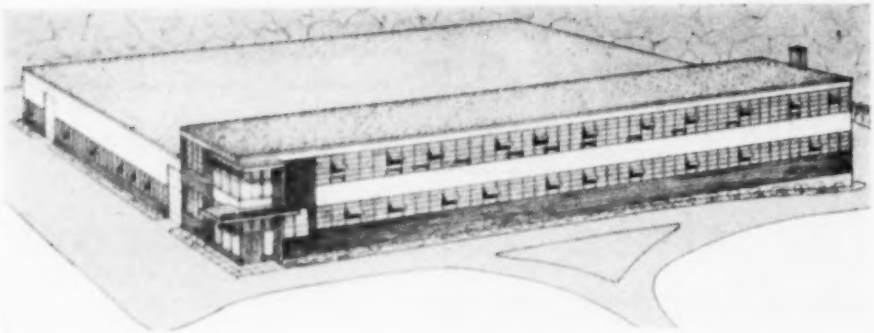


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Chuck Division

THOMAS HOIST CO.

28 S. HOYNE CHICAGO 12



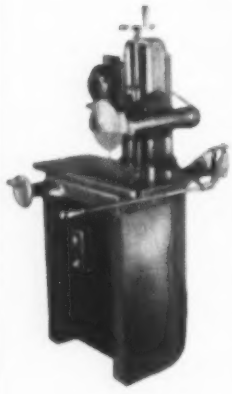
Wash drawing of new plant now being constructed by Reed Rolled Thread Die Co., Worcester, Massachusetts

Construction of New Plant Begun by Reed Rolled Thread Die Company

The Reed Rolled Thread Die Co., Worcester, Mass., has begun construction of a completely new plant, according to an announcement by A. Bradford Reed, president of the company. Improved plant layout and additional equipment will enable the company to handle more efficiently the increased demand for thread rolling machines, dies, knurls, and thread rolls.

Founded in 1916 as the Reed Small Tool Works, the company purchased its present site in 1927 when it was in-

PRODUCTION JUMPER



Crosman's hand operated "T" Grinder and No. 20 Chaser Grinder ups production, puts money in your pocket. The "T" Grinder though small in size takes big jobs in its stride—grinds dies, tools and parts up to 4" wide, 8" long and 10" high with accuracy and excellent finish. The No. 20 Chaser Grinder accurately resharpens Chasers—both on the chamfer and cutting face.



"T" SURFACE GRINDER

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"20 CHASER GRINDER

J. B. CROSMAN & SON, INC., EAST WALPOLE • MASS.

For 50 Years
MOLINE "HOLE-HOG"
MACHINE TOOLS
HAVE SERVED
AMERICAN INDUSTRY
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DRILLING - BORING -
HONING - TAPPING
and SPECIAL MACHINES

MOLINE TOOL COMPANY
102 20th St. MOLINE, ILLINOIS

HOWALD CARBIDE
MILLING CUTTERS



- SQUARE BLADES Easily Replaced.
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- Cutters from 1½" to 14" dia.



PATENTED END MILL

SHELL MILL

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MACHINE WORKS
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SAVE SET-UP TIME...



with "DE-STA-CO"
ARBOR SPACERS and SHIMS

IT COSTS YOU MONEY when machinists waste time hunting for arbor spacers. SAVE TIME with two sets of "De-Sta-Co" Arbor Spacers for every milling machine in your shop.



ARBOR SPACERS Keywayed



SHIMS Not Keywayed

Handy sets available for 20 arbor diameters (⅜" to 4"), 19 graduated thicknesses (.001" to .125") *with standard keyway*. Shims same sizes, *without keyway*. Sets sealed in clear polyethylene envelopes, with size plainly marked. Specials, over .125" thick, available in popular arbor sizes and thicknesses, machined from bar stock, hardened and ground, with standard keyways, identified as to thickness.

Machinists prefer durable "De-Sta-Co" steel Arbor Spacers and Shims for milling, slitting and gang-saw setups and for shimming gears and bearings. YOUR SHOP SAVES, too, when each machine has two sets handy for speedy setups. Ask your mill supply house for them by name, "De-Sta-Co", or write for Spacer and Shim Stock Price List.

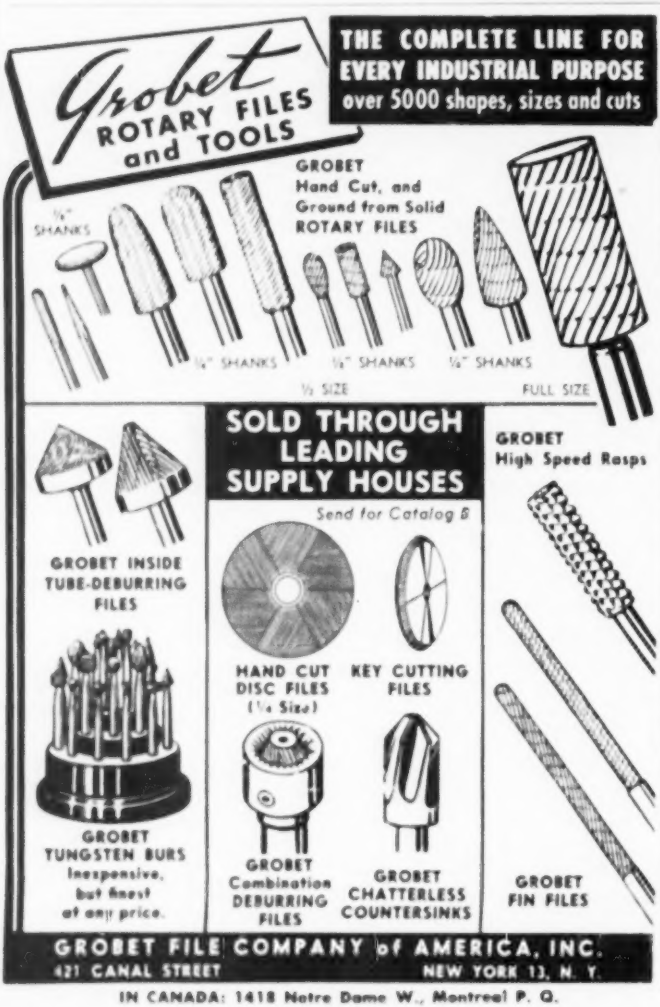
DETROIT STAMPING COMPANY
349 MIDLAND AVE. • DETROIT 3, MICH.

corporated as the Reed Rolled Thread Die Company. Originally, the company manufactured micrometers; however, during the early 1920's it began producing thread rolling dies. In the early 1930's, the company added knurls to its line of manufacture. In 1942 work was begun on a thread rolling machine employing three cylindrical dies, and the successful application of this principle of three cam-actuated dies greatly broadened the use possibilities of precision thread rolling to include component parts.

Trepanning Lathe Demonstrated by Heppenstall Company

A high speed trepanning lathe for the rapid cutting of alloy steel was demonstrated recently at the Pittsburgh plant of the Heppenstall Company, die block, shear knife, and general forgings manufacturer. Said to be readily applicable to a wide range of defense and peacetime production, the lathe, which utilizes the same basic principle as that employed by a housewife in removing an apple core, was demonstrated before more than 100 key production and management representatives from steel companies, machine tool builders, and forging plants, and others.

According to C. W. Heppenstall, vice president who supervised the design and building of the trepanning lathe,



MORE FOR YOUR SCRAP

DURANT SCRAP CHOPPER

LOW FIRST Cost
PAY FOR ITSELF

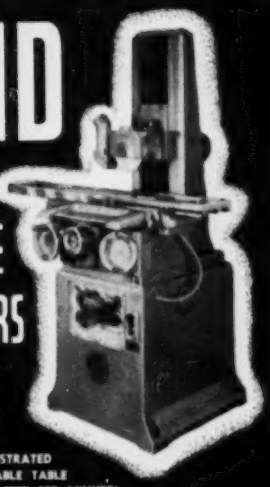


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Economical operation
Fits Any Power press

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DURANT TOOL SUPPLY CO.
155 ORANGE ST., PROVIDENCE 3, R. I.

REID
• SURFACE GRINDERS •



REID MODEL ILLUSTRATED
618 V WITH VARIABLE TABLE
SPEED (12 TO 35 FEET PER MINUTE)

SEND FOR CATALOG AND PRICES ON ALL MODELS

REID BROTHERS COMPANY, INC.
ESTABLISHED 1910 • BEVERLY, MASSACHUSETTS

SAWMASTER HACK SAW



LOW PRICED
•
PORTABLE
SELF-CONTAINED
•
READY TO WORK
Angle Cutting Vise
STURDY
ECONOMICAL

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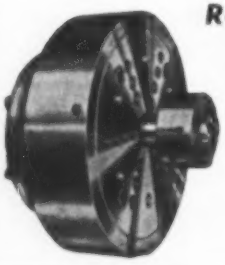
MILLER-KNUTH MFG. CO. OMAHA, NEB.



A control panel with only a few push buttons is one of the features of a new high speed trepanning lathe recently demonstrated by the Heppenstall Co., Pittsburgh, Pa. On the wall in front of the operator are instruments that record lathe revolutions per minute, rate of feed in inches per minute, per cent load on main motor drive, plus coolant temperature and pressure.

the machine is capable of matching the work load and output of 20 standard American boring lathes and will greatly expedite the production of such important defense items as gun barrels and gun housings. The lathe is said to pare out a solid metal core from tough alloy steel bars or rounds, leaving a highly finished accurate bore through the metal. Since a complete metal core is removed by trepanning, Heppenstall officials state that great tonnages of premium metal are saved for other useful purposes and product fabrication.

Mr. Heppenstall explained to the persons attending the demonstration that, in addition to defense production, the trepanning lathe offered important advantages in the manufacture of such standard peacetime items as gear forgings, oilfield drill collars, and turbine and generator rotor forgings. The unusual cutting speed claimed for the trepanning technique was shown when a penetration rate of 480 inches per hour was obtained in producing a $2\frac{5}{8}$ inch diameter bore in an 8-inch round 4-foot long steel bar. A solid core $1\frac{1}{8}$ inches in diameter was removed after trepanning. Mr. Heppenstall said that similar lathes could easily be built to handle workpieces many times the size of the alloy steel stock used in the demonstration.

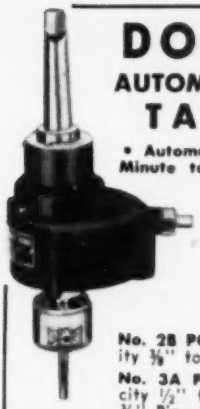


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DORMAN
AUTOMATIC REVERSE TAPPERS

- Automatic Torque Control, One Minute to Adjust, Prevents Tap Breakage, Operator Need Not Be Skilled.
- WIDE RANGE TAP CAPACITY.

No. 1 FRICTION DRIVE TAPPER—capacity No. 2-56 to ⅜" in Steel—½" in Aluminum.

No. 2B POSITIVE TAPPER—capacity ⅜" to ⅞" in Steel.

No. 3A POSITIVE TAPPER—capacity ½" to 1¼" in Steel—½" to ¾" Pipe Taps.

No. 4A TAPPER — capacity ¾" to 2" in Steel including Pipe Taps.

- PRODUCTION THREADERS with Round Split . . . Button . . . Acorn Dies.

Priced from $48.00
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IMMEDIATE DELIVERY

THRIFTMASTER PRODUCTS CORPORATION
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1034 N. PLUM STREET, LANCASTER, PA.
STANDARD AND SPECIAL THREAD INTERCHANGEABLE



"BUILT-IN" FEATURE
Saves 50% FLOOR SPACE



Hammond
NO-DUST GRINDER

- Requires only 6½ square feet.
- Protects employees' health — and nearby machine tools from dust and grit.

For 10", 12" and 14" wheels.

WRITE FOR CATALOG

Hammond Machinery Builders
1615 DOUGLAS AVE., KALAMAZOO, MICH.



For Simplicity in
OIL GROOVING!

The FISCHER No. 1 Oil Groover cuts a wide variety of grooves in bearings up to 8" in length and up to 5" inside diameter. A few simple settings permit you to cut continuous, relieved, straight or spiral grooves at any angle from parallel to perpendicular to the work. Grooves may also be cut in shafts, housings, etc.

This machine will slash grooving time and deliver continuous profitable production in your shop. It will pay to find out what it can do on your grooving jobs.

Write for Catalog.

Send parts for free grooving and production estimate

Fischer Machine Co.

316 N. ELEVENTH ST. — PHILADELPHIA 7, PA.
Established 1900

Did You Know That---

The Ready Tool Co., Bridgeport, Conn., has appointed the **David R. Grossman Co.**, 155 E. 44th St., New York City, as its Metropolitan New York and world wide export distributor for "Red-E" machine tools. David R. Grossman, president of the Grossman firm, and Ralph O. Wirtenburg, director of sales, will be in charge of Red-E Tool sales.

C. A. Wagner, with headquarters in Dallas, has been appointed by The Billings & Spencer Co., Hartford, Conn., manufacturer of drop forged wrenches and shop tools, as its direct representative for Texas, Arkansas, Louisiana, and Oklahoma.

—o—

S. G. Thornbury, president of Turco Products, Inc., Los Angeles, Calif., has announced the retirement of Lou H. Moulton, vice president and national sales director, and the appointment of **Dan T. Buist** as the new national sales director. In addition, **Stewart B. Van Dyne** has been named administrative assistant and **Dan T. Miller** as coordinator of sales—both newly created positions.

—o—

The appointment of **A. H. Lewis, Jr.** as manager of the Syracuse, New York branch of the Crucible Steel Company of America has been announced by W. H. Wiewel, vice president in charge of sales. Mr. Wiewel has also announced the appointment of **H. B. West** of Syracuse as sales engineer.

3-WAY 4-WAY
PILOT-OPERATED
VALVES

Short Solenoid Strokes Permit High Operating Speeds with Full Volume Operation

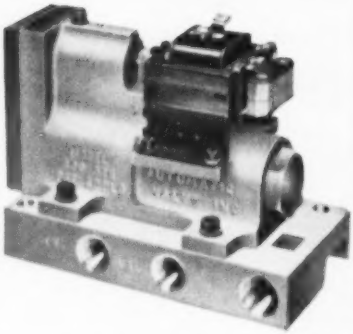
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CYCLING TO 600 PER MIN.

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FOR CONTROL OF COMPRESSED AIR-PRESSURES 20 TO 150 LBS.



Available in standard pipe sizes.

Thousands of AUTOMATIC 3-way and 4-way valves in daily operation. Write for bulletin and prices. Attractive quantity and O.E.M. discounts.

AUTOMATIC VALVE CO.
37419 GRAND RIVER AVE., FARMINGTON, MICH.

PIONEERS and SPECIALISTS in PILOT OPERATED SOLENOID CONTROLLED VALVES

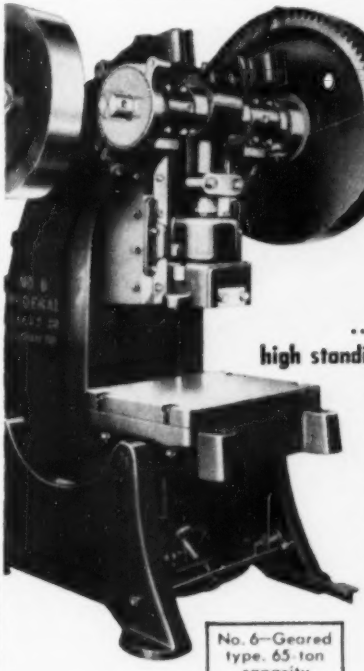
Did You Know That---

The Cleveland Crane & Engineering Co., Wickliffe, Ohio, manufacturer of heavy overhead traveling Cranes, Cleveland Tramrail overhead materials handling equipment, and Steelweld presses and shears, has announced the appointment of **Ancel C. Adams,** formerly assistant plant superintendent, as general plant superintendent.

—o—

Morse Twist Drill & Machine Co., New Bedford, Mass., has announced the appointment of **T. W. Haines,** formerly one of its Metropolitan New York representatives, as district manager for Philadelphia and eastern Pennsylvania. Working with Mr. Haines will be **W. T. Rogers,** whose appointment as territory representative in this area has also been announced. Mr. Haines has been replaced in New York City by **R. W. Kuhn.** Morse has also announced additional representation in New York City by **R. E. Bennett.**

Link-Belt Company, manufacturer of materials handling and power transmission machinery, has announced that **Maurice J. Erisman,** chief engineer at the Los Angeles plant, has been appointed chief engineer for the company's Pershing Road plant with headquarters at 300 W. Pershing Rd., Chicago. **Homer J. Foye,** chief engineer at the Seattle plant, has been appointed chief engineer in Los Angeles to succeed Mr. Erisman.



QUALITY PLUS

...the secret of FEDERAL'S high standing among metalworkers!

No. 6—Geared type, 65-ton capacity.

Throughout the industry the name FEDERAL stands for quality *plus*. Built into every FEDERAL PRESS this extra quality includes such features as Timken Bearings, oversized crankshafts, solid web-tight flywheels, symmetrical rams, longer "V" ways and gibs. The FEDERAL standard of workmanship can be seen in the *easy operation*, the *absence of down time*, the *longer life*. Get this *extra* quality when you next buy.

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FEDERAL *Open Back Inclinable* **PRESSES**

25 YEARS OF QUALITY CONSTRUCTION

Did You Know That---

The Rockwell Manufacturing Company of Pittsburgh will build a new 150,000 square foot manufacturing plant in Tupelo, Mississippi, according to W. F. Rockwell, Jr., president of the company. Present plans call for employment of approximately 300 persons, all but a few of whom will be hired locally.

Herbert B. Nechemias has been appointed manager of the industrial sales department at Wagner Electric Corp., St. Louis, Mo., succeeding **J. S. Smith** who has been appointed director of purchasing.

— o —

American Swiss File & Tool Co., Newark, N. J., manufacturer of Swiss-pattern files, milled curved tooth files, rotary files, and mechanics' hand tools, has appointed **C. Fred Watkins** as general sales manager. Mr. Watkins was previously assistant to the vice president in charge of sales.

— o —

Ladish Co., Cudahy, Wis., manufacturer of forged and seamless welding pipe fittings and drop forgings, has announced the appointment of **E. O. Dixon** as vice president in charge of research and metallurgy and **T. L. Swansen** as vice president in charge of manufacturing. Mr. Dixon has been with the Ladish Company for over 20 years; Mr. Swansen joined the company in 1947.

YESTERDAY'S PIONEER . . . TODAY'S LEADER



TAPERED END MILLS CONSTANT SPIRAL

(Die Sinking Cutters)

● The extensive line of the well known Weldon End Mills includes Tapered End Mills, Constant Spiral. Also known as Die Sinking Cutters these end mills, filling a definite need, come in a wide range of sizes, giving a choice of many lengths and diameters. Weldon Tapered End Mills as standard stock items are all 3-flute, and offer a choice of ½°, 1°, 2°, 3°, 5° and 7° angles. They represent the same high quality for which all Weldon End Mills are famous.

Weldon distributors throughout U.S.A. and Canada carry complete stocks to serve you.

THE WELDON TOOL CO. Cleveland 4, Ohio

3000 WOODHILL ROAD

Did You Know That ---

Kennametal Inc., Latrobe, Pa., manufacturer of cemented carbide products, has opened a district office in the Metropolitan Bldg., Minneapolis, Minn., where **Harry Brandvik,** formerly a service engineer in the Midwestern district, will serve as Kennametal representative. The company has also announced the appointment of **William J. Collins** as representative in the New England district and **Frank Price** as engineer in the Middle Atlantic district.

— o —

Arcos Corp., Philadelphia, Pa., manufacturer of stainless, low alloy high tensile and non-ferrous electrodes, has announced the opening of a west coast office and warehouse at 427 S. Western Ave., Los Angeles, Calif. **B. E. David** has been appointed district manager.

The Van Norman Co., Springfield, Mass., has awarded the sales representation of its machine tools in Illinois, Wisconsin, Iowa, western Michigan, eastern Nebraska, and northern Indiana to the **E. L. Essley Machinery Co.,** 565 W. Washington Blvd., Chicago, Ill. This organization will offer the complete line of Van Norman machine tools, including ram type and horizontal milling machines and production grinders for cylindrical, spline, gear, or radius work.

— o —

Sealol Corp., Providence, R. I., Manufacturer of mechanical seals for rotating shafts, has announced the formation of a subsidiary company, Sealol Manufacturing Company, to be located in Keene, N. H. Research, engineering, and sales will continue to be handled by Sealol Corp. Providence.

NEW *Commander*

DRILL CHIP BREAKER





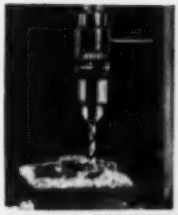


ORDINARY CHIPS

Get these COMMANDER DRILL CHIP BREAKER benefits now:

- Faster Drilling
- Deeper Holes
- Better Holes
- Longer Drill Life
- Safer, Cleaner Work
- REDUCED DRILLING COSTS

Your nearby COMMANDER Distributor has the Drill Chip Breaker. Write for his name, full details and illustrated circular.



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Product of *Commander* . . . Builder of Production Tools

YOU PROFIT on every job you send to Rutland!



Rutland reworked or repaired cutting tools are guaranteed to give new tool performance — at a fraction of the new tool cost.

Recutting • repairing • replacing Carbide tips. Special tools from obsolete or standard tools, etc.

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Rutland TOOL SERVICE

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AUTOM



CONTINUOUS HINGES

Manufactured by

AUTO MOULDING & MFG. CO.

WRITE FOR STOCK LIST

1114 E. 87TH ST. CHICAGO 19

Did You Know That ---

H. Edward Neale, formerly representative in the Chicago territory, has been appointed assistant sales manager of The Bullard Company, manufacturer of machine tools. As assistant to Frank U. Hayes, Bullard sales manager, Mr. Neale will be located in the company's home office at Bridgeport, Connecticut. **James L. Shay** succeeds Mr. Neale as representative in the Chicago area and will be located at the offices of Marshall & Huschart Mchry. Co., 571 Washington Blvd., Chicago, Illinois.

—o—

A. William Fraser, formerly general European manager, has been appointed midwest sales manager of Worthington Pump and Machinery Corporation and will direct the sales of the Chicago, St. Paul, Kansas City, and St. Louis offices, making his headquarters in Chicago.

—o—

Norman W. Calkins has been named manager of tool steel sales and **Harold A. Brossman** manager of alloy steel sales by The Carpenter Steel Co., Reading, Pennsylvania.

—o—

Frank L. Hooper has been appointed general sales manager of the Kalex Corp., 305 E. 46th St., New York City, exclusive distributor in the United States of Cary high precision gages.

—o—

A. R. Wise, vice president and sales manager of The Cleveland Tapping Machine Company, a subsidiary of Automatic Steel Products, Inc., Canton, Ohio, has announced the appointment of **Harrington-Wilson-Brown Company,** New York City, as exclusive dealer in Metropolitan New York and northern New Jersey for the entire line of Cleveland tapping machines.

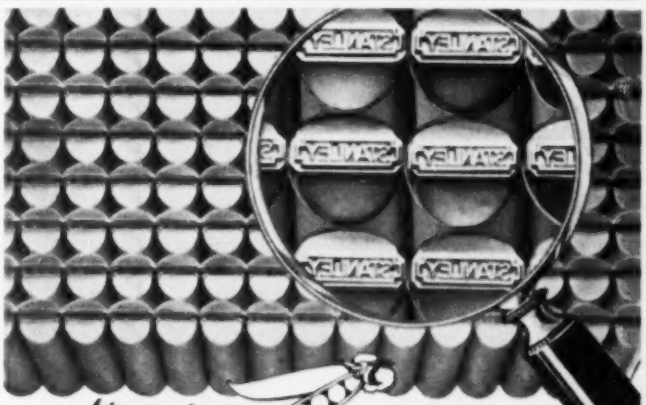
Did You Know That ---

Alfred P. Barton has been named chief engineer for the ordnance division of Elgin National Watch Company, with headquarters in Lincoln, Nebraska. The ordnance unit was formed recently to facilitate Elgin's manufacture of mechanical time fuses and other ammunition components in connection with the rearmament program.

—o—

Dale D. Spoor, manager of the equipment sales department of Air Reduction Sales Co., a Division of Air Reduction Co., Inc., New York 17, N. Y., has been granted a leave of absence to serve with the National Production Authority in Washington, D. C. Mr. Spoor, as chief of the Welding Section of the Machinery Division of N. P. A., will head the group to which all manufacturers of welding equipment, apparatus, supplies, electrodes, and welding rods will look for their requirements of critical materials.

The Hilliard Corp., Elmira, N. Y., manufacturer of lube, fuel and industrial oil filters, reclaimers, and purifiers, has announced the appointment of the **Betz Engineering Sales Co.,** 1225 Magazine St., New Orleans, La., as representative for the territory of Louisiana, Mississippi, and southern Arkansas.



ALIKE AS - "Peas in a Pod"

STANLEY Tools, famous for quality the world over, are marked cleanly, accurately and permanently with Parker steel stamps. Each marking die and stamp embodies the same degree of accuracy and perfection as the tools themselves. The dependable STANLEY name is permanently indented into each tool as a lifetime mark of a better product. Parker steel stamps individually, or by the hundreds, perfect in every detail, mark famous names on famous products everywhere.

The same craftsmanship, the same accuracy is available to you to solve your marking problems. Steel stamps, marking dies in any quantity, in any size or shape, one or dozens, manufactured from high grade steels and expertly heat treated for longer life. Parker hand and press marking dies made to your specifications, enlarged or reduced from your drawings, retain perfect proportions.

For trade marks, identifications, symbols, inspection, patent or part numbers — for marking steel, brass, aluminum, plastic or wood — for marking flat, concave, convex or spherical surfaces. Investigate the FLEXIBILITY of Parker's facilities today!

SEND FOR THE PARKER BLUE BOOK TODAY!



THE PARKER STAMP WORKS, INC.
MARKING DIE & MACHINERY DIV.
by Parker
FRANKLIN AVENUE • HARTFORD, CONNECTICUT

Did You Know That ---

V. R. Peiffer, formerly assistant plant manager at Bowen Products Corp., Ecorse, Mich., has been appointed director of production of the Warner Division, Clinton Machine Co., Detroit, Mich. **Carl L. Kalitta,** formerly with Vickers, Inc., Detroit, has been named chief design engineer of Warner.

John B. Dempsey, manager of Independent Pneumatic Tool Company's Pittsburgh branch, has been named manager of the Detroit branch, succeeding **Robert G. Faverty** who has been appointed managing director of Armstrong-Whitworth and Company, Pneumatic Tools, Ltd., new Thor subsidiary in England. **Edward W. Krantz,** manager of the New York branch, has been named Pittsburgh manager to succeed Mr. Dempsey. **William J. McGraw,** Cleveland branch manager, has been appointed manager of the New York branch to succeed Mr. Krantz. **Clarence B. Bergren,** service engineer in the St. Louis territory, is the new Cleveland branch manager, succeeding Mr. McGraw.

o

H. E. Dickerman Mfg. Co., Springfield, Mass., manufacturer of automatic punch press feeds, has appointed the **Gullberg Die Supply Co.,** E. Grand Blvd., Detroit, Mich., as distributor of its hitch feeds, die feeds, and Rol-Di-Feeds in that area.

SYNTRON

"Vibra-Flow"

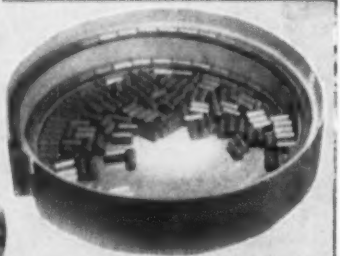
PARTS FEEDERS

Will feed parts . . . small, medium or large . . . of various shapes and materials . . . single file . . . in oriented position . . . at variable rates . . . WITHOUT DAMAGE . . . to grinders and presses, inspection and packaging devices, and other automatic processing equipment.

Units are very compact. Operate by controlled electromagnetic vibration—no motors, gears, cams, belts, etc., to require expensive maintenance.



Feeding ⅛" Dia. Grommets



Feeding Steel Slugs



Feeding Flat Washers

Catalog data upon request. Or send details of your problem along with sample parts to . . .

SYNTRON CO.

309 Lexington Ave. Homer City, Pa.

Did You Know That ---

Howard C. Moncrieff, president of Swan-Finch Oil Corp., New York, N. Y., has announced the promotion of **Anthony J. Zino, Jr.**, from sales promotion manager and chief lubrication sales engineer to assistant to the president.

— o —

Walter Zimmerman has been appointed district manager for the Columbia Tool Steel Company and will have charge of the tool steel warehouse and office at 2716 Spring Grove Ave., Cincinnati, Ohio.

— o —

Robert W. Walcott, chairman of the board of Lukens Steel Co., Coatesville, Pa., has been appointed chairman of the Government Contracts Committee of the National Association of Manufacturers.

S. Duncan Black, president of **The Black & Decker Mfg. Co.**, Towson, Md., has announced that the company has purchased approximately 180 acres at Hampstead, Maryland, where a branch plant to provide additional facilities for the manufacture of portable electric tools will be erected.

— o —

Elliott Harrington has been appointed vice chairman and secretary of a newly established Defense Projects and Priorities Committee of General Electric Company's Small and Medium Motor Divisions. Mr. Harrington's former duties as manager of the Induction Motor Sales Division will be assumed by **R. S. Walsh. D. S. MacDonald** has been appointed sales manager of a newly created Gear Motor Section of the Gear Motor and Packaged Drive Division of General Electric's Small and Medium Motor Divisions.

STOP DUSTS *with* **DUSTKOP**

22 different Dustkops — 300 cfm to 10,000 cfm

available from stock.

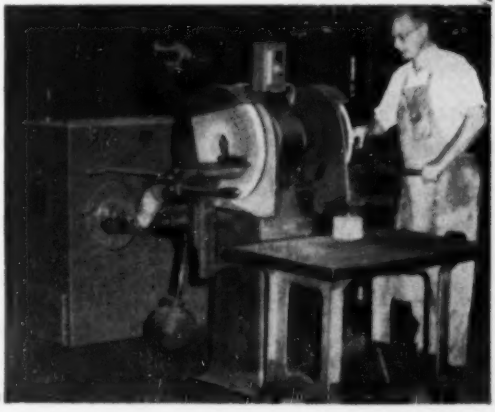
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- **Surface Grinders**
- **Tool Grinders**
- **Cutter Grinders**
- **Abrasive Belts, Discs**
- **Polishing, Buffing . . .**

. . . *any* industrial dusts.

Send now for new Catalog 605b. Describe dust problem for recommendation by return mail; no obligation.

AGET - DETROIT CO.
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Ann Arbor, Mich.



Did You Know That ---

Everett S. Lee, nationally-known figure in the field of engineering, has been appointed editor of the "General Electric Review," monthly engineering magazine published by the General Electric Co., Schenectady, N. Y. Mr. Lee succeeds **Edward C. Sanders** who retired recently after serving since 1925 as executive editor.

DeWalt Inc., Lancaster, Pa., manufacturer of cutting machines for the woodworking, metal, and plastics industries, has announced the appointment of **Walter H. Roesing** to the position of district sales manager of the New York counties of Westchester, Putnam, and Rockland; the New Jersey counties of Sussex, Passiac, Bergen, and Morris; and all the trading areas of Connecticut.

Edward L. Holljes, general sales manager of the William Sellers Company, a division of the Consolidated Machine Tool Corp., Rochester, N. Y., died recently in Delaware County Hospital at the age of 66. He had been with the Sellers firm for more than 40 years.

Star-Kimble Motor Division, Miehle Printing Press & Mfg. Co., Bloomfield, N. J., has appointed the **Baldwin Co.**, 2935 Lovers Lane, Dallas, Tex., as its representative in the states of Texas, New Mexico, and Oklahoma.

John T. Monahan has been appointed assistant sales manager of the Safety Products Division, American Optical Co., Southbridge, Mass., according to an announcement by C. H. Gallaway, sales manager of the division.



Did You Know That ---

Russell L. Peck, refractories engineer for the Norton Company, was killed recently in an automobile accident in Tallulah, La. **Norman K. Russell** has been appointed refractories engineer and will assume the territory formerly covered by Mr. Peck, with headquarters at Norton's Philadelphia warehouse.

—o—

A. R. Wise, vice president and sales manager of The Cleveland Tapping Machine Company, subsidiary of Automatic Steel Products, Inc., Canton, Ohio, has been appointed assistant general manager of the company.

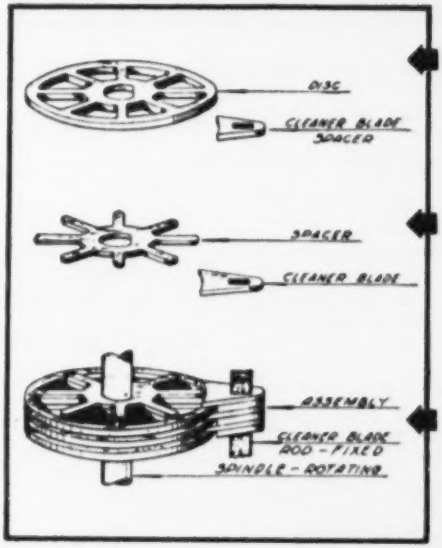
—o—

Chester F. Delbridge has been appointed general sales manager of The K-G Equipment Company, (Inc.), the new name of K-G Welding & Cutting Co., Inc., New York, manufacturer of welding and cutting torches and related equipment. Mr. Delbridge's office is located at 50 Broadway, New York 4, New York.

Philip D. Moore, for the past three years administrative assistant to the vice president in charge of employee, community and union relations at the General Electric Company, New York, has been appointed manager of employee and community relations for Carboloy Co., Inc., Detroit, producer of cemented carbides for cutting tools, dies, and wear-resistant materials, as well as other special metals.

Non-Stop Fluid Cleaning

Why there's no loss of production due to strainer cleaning when you strain with Cuno AUTO-KLEAN



Turning metal discs past cleaner blades* . . .

combs out all solids, even *imbedded* in strainer . . .

without interrupting flow. No by-pass strainer needed.

*Periodically by hand or continuously by automatic means.

All-metal AUTO-KLEAN is *guaranteed* to remove all solids larger than specified spacings (.0035 in. to .062 in.) Write for free AUTO-KLEAN bulletin. Cuno Engineering Corporation, 186 South Vine Street, Meriden, Conn.

CUNO

Fluid Conditioning

Removes More Sizes of Solids from More Types of Fluids

Book Reviews

The Practice of Lubrication. Fourth Edition. By T. C. Thomsen. Published by McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 18, N. Y. 617 pages. Illustrated. Cloth binding, board covers. Price, $8.00.

This engineering manual deals with the origin, nature, and testing of lubricants, including their selection, application, and use, and provides thorough coverage of all factors involved in correct lubrication procedure. It analyzes numerous typical lubrication problems from an engineering standpoint and points out the appropriate solution for each of them.

The book covers all significant advances in the science of lubrication that have accompanied recent developments in engine and machinery construction, including those made in aeroengines and aircraft accessories. New achievements involving the distillation and refining of lubricating oils, the manufacture of inhibitives, or additives, to improve the performance of a variety of oils and lubricants, and solvent refining processes are but three of several important and timely subjects which are discussed in this fourth edition. Other important developments discussed in this fourth edition include the ever-widening field of synthetic oil production and use and the increasing use of rubber, press metal, and fiber bearings.

IT PAYS TO MEASURE CUTTING FLUID PRICE IN TERMS OF PERFORMANCE

Hob Life Increased 100% with Stuart's THREDKUT

SOMETIMES the best cutting fluid for a job costs more per gallon, sometimes less. But the *real cost is in its use!* Here's an example:

A manufacturer hobbing large gears (63 teeth, 6" face, 2½" pitch, 3854 forging—290 to 310 Brinell) was paying 44¢ per gallon for cutting oil and producing 3 gears per tool grind. Now, using a blend of Stuart's THREDKUT at 54¢ per gallon he gets *6 pieces* per tool grind.

THE INCREASE IN HOB LIFE and PRODUCTION plus THE DECREASE IN LABOR makes the Stuart oil far, far cheaper to use!

Write for literature and ask to have a D. A. Stuart Representative call at your plant.

D.A. Stuart Oil CO.

2741-47 S. TROY STREET, CHICAGO 23, ILL.

Impact Die Forging (Drop Forging). Published by Chambersburg Engr. Co., Chambersburg, Pa. 7 x 9-inch pages. Plastic binding. Price, $1.50.

This volume comprises a course on the principles of drop forging prepared by the Chambersburg Engineering Company with the cooperation of the School of Engineering of Princeton University. The original course was prepared seven years ago and has been reissued with some minor revisions.

The material in the book is divided into five main sections, the first of which is entitled "Why a Drop Forging?" and includes charts and text covering reasons for producing a part by drop forging rather than by other fabricating processes. In addition, the characteristics of the principal metals used in drop forging are outlined. Section 2, entitled "The Drop Hammer," presents details of the machinery for producing a drop forging, while Section 3, "Design of a Drop Forging," contains charts and text regarding basic rules to be followed in designing a part for drop forging. Section 4, "The Drop Forging Process," presents a sequence of steps from bar stock to final forging and also the basic principles of die design. Section 5, "Drop Forging Manufacturing Tolerances," covers thickness, shrinkage, mismatching, trimmed size, draft angle, quantity, fillet and corner tolerances.

Cut Costs with MEAD

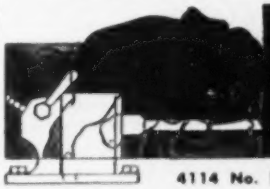
MIDGET AIR-CLAMPS

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Both models deliver 80 lbs. pressure on a line pressure of 100 lbs. They'll save countless man-hours in assembly operations involving welding, riveting, bolting, etc. Advantages over mechanical clamps: 1, Any number can be operated by single master valves. 2, Easily installed in cramped corners. 3, Equal ram pressure at any stroke point. Send for new Mead AIR POWER Catalog, describing our line of Air Clamps, Air Vises, Air Presses, Work Feeders, Valves, Controls, etc.



MEAD

SPECIALTIES COMPANY

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Ingenious Mechanisms for Designers and Inventors (Volume 3). Edited by Holbrook L. Horton. Published by The Industrial Press, 140-148 Lafayette St., New York 13, N. Y. 536 pages, 6 x 9 inches. 317 illustrations. Cloth binding, board covers. Price, $6.00.

This is a companion book to Volumes 1 and 2 of the work "Ingenious Mechanisms for Designers and Inventors" previously published. Each volume is a self-contained reference work, the combined set forming a comprehensive encyclopedia of mechanical movements. The use of Volume 3 in conjunction with Volumes 1 and 2 has been facilitated by grouping mechanisms of the same general types under comparable chapter headings. For example, Chapter 2 of Volume 3 contains descriptions of some twenty gear and cam mechanisms for producing intermittent motion that are all different from, but perform functions similar to, those described in Volumes 1 and 2 under a similar heading.

Volume 3 deals with the following subjects: Cam Applications and Special Cam Designs; Intermittent Motions from Gears and Cams; Intermittent Motions from Ratchet and Goneva Mechanisms; Overload, Tripping, and Stop Mechanisms; Locking, Clamping, and Locating Devices; Reversing Mechanisms of Special Design; Reciprocating Motions Derived from Cams, Gears, and Levers; Crank-Actuated Reciprocating Mechanisms; Variable - Stroke Reciprocating Mechanisms;



SUPERIOR HONE CORPORATION
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Mechanisms which Provide Oscillating Motion; Mechanisms Providing Combined Rotary and Linear Motions; Speed-Changing Mechanisms; Speed-Regulating Mechanisms; Feed-Regulating, Shifting, and Stopping Mechanisms; Automatic Work-Feeding and Transfer Mechanisms; Feeding and Ejecting Mechanisms for Power Presses; and Miscellaneous Mechanisms.

Quality Control: Principles, Practice and Administration. By A. V. Feigenbaum. Published by McGraw-Hill Book Co., 330 W. 42nd St., New York 18, N. Y. 443 pages. Cloth binding, board covers. Price, $7.00.

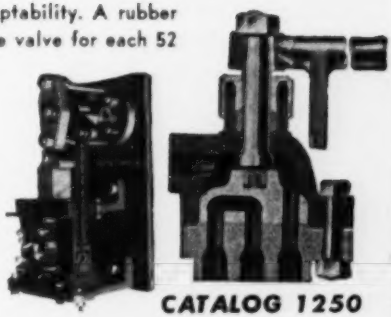
This book presents quality control as a business method for actual plant application—as an industrial management tool for improving product quality and design and for reducing operating costs and losses. It covers methods of quality control and shows how to introduce and maintain an effective program.

The book is divided into four sections, the first of which describes, from a general management standpoint, the nature and potential uses of quality control—activities, organization, and results to be expected. The second section covers the statistical tools required for the use of quality control, while the third section considers the application of quality control in engineering, purchasing, incoming inspection, manufacturing, sales, packaging, and so on. The fourth section develops the procedures for actually instituting a program and discusses the "selling" job that must often precede establishment of such a program.

Stock Fewer Spares. You Can

Use Nicholson Valves for Any Pressure Medium

Nicholson control valves offer maximum adaptability. A rubber processor reports that they carry only 1 spare valve for each 52 in service. Unlike many poppet or balanced-piston valves, they can be used for steam as well as air, gas, oil or water. Lever, foot, solenoid, motor types; size ¼" to 2½"; press. to 5,000 lbs.



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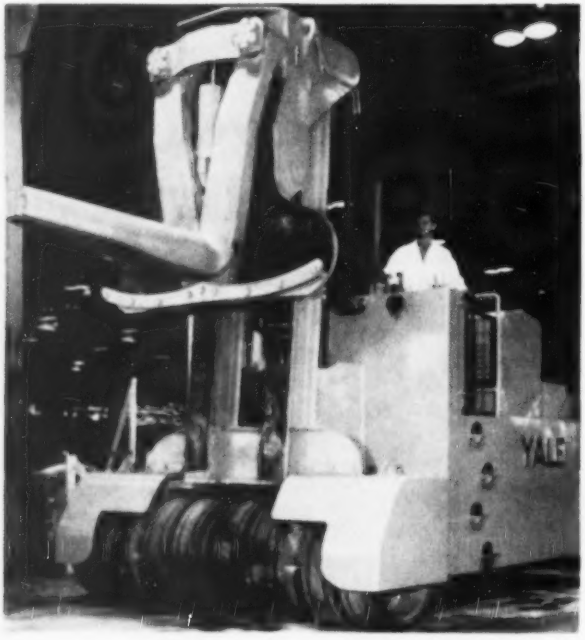
Steam & Air Traps, Control Valves, Expanding Mandrels, Arbor Presses, Welded Floats

CATALOG 1250

Mechanical Engineers' Handbook. 5th Edition. By Lionel S. Marks. Published by McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 18, N. Y. 2,236 pages. Cloth binding. Price, $15.00.

More than 100 engineers, each a recognized authority in his special field, have cooperated to produce this volume of carefully selected data on every branch of mechanical engineering. Sixteen up-to-date sections provide authoritative answers to thousands of questions in easy-to-find reference form. The author's comprehensive yet concise coverage of mechanical engineering theory, standards, and practice provides extremely helpful information in such fields as aeronautics, mechanical refrigeration, power generation, welding, metal-cutting, machines, hoisting and conveying, and so on.

Significant recent developments discussed under the heading of "Theory" are fluid mechanics, stresses in turbine discs, transonic and supersonic aerodynamics, aircraft jet propulsion, rockets, and television. Under "Processes," the author discusses radiant or panel heating, solar heating, high-vacuum pumps, industrial supersonics, modern casting methods, statistical quality control, and automatic process control. This edition also provides new or greatly revised information on the materials of engineering, including ferrous and non-ferrous alloys, superalloys for highest temperatures, plastics, elastomers, silicones, adhesives, rocket fuels, reflective heat insulation, and powder metallurgy. Power costs



THE completion of an 80,000-lb. capacity industrial truck, believed to be the largest of its kind, was announced recently by The Yale and Towne Manufacturing Company's Philadelphia Division. Built for the steel industry, this giant truck weighs 84,000 lb. and is powered by a unique Diesel-electric unit of the same size used in a 25-ton locomotive. On the front of the truck are two huge snout-like rams that open and close like a scissors and allow for the handling of one large coil of steel or two smaller ones. Other features of the truck include dual controls and narrow construction of the lifting channels which provides maximum visibility for the operator at all times.

are analyzed in the light of current conditions, as are gas turbines and atomic energy as power sources. A completely cross-referenced index of more than 12,000 entries and a new enlarged format, thumb-indexed, are designed to meet the daily needs of engineers.

Card-All. Published by General Design Co., 1200 Commercial Trust Bldg., Philadelphia 2, Pa. 12 pages, 4½ x 6½ inches. Wire binding. Price, $1.00.

Intended for use by engineers and draftsmen, as well as production and shopmen, this handy compact reference book contains no explanatory written material — only tables and formulas. Information presented includes basic dimensions of American Standard screws; tap and clearance drill sizes for screws; sheet metal and wire gauge sizes; formulas for calculating spur gears; conversion tables for measure, pressure, power, and so on; table of decimal equivalents; table of natural function of angles; formulas for trigonometric solution of triangles; formulas for areas and volumes; comparative physical and mechanical properties of metals; dimensions of machine screw nuts, plain washers, and taper pins; twist drill sizes; dimensions and tap drill sizes for taper pipe threads; and many of the more common formulas used in engineering. Color indexing facilitates the selection of the information desired.

Being wire bound, the Card-All can be folded double so as to occupy a minimum of space on a table or desk.



GOES A LONG WAY

to eliminate weld spatter cleanup

Unsightly costly weld spatter simply wipes off, in a matter of seconds, when you brush or spray Protect-O-Metal No. 2 in the weld seam and on adjacent surfaces before welding. And you save up to 85% of weld cleaning labor, conserve man-hours for productive work. Weldors like Protect-O-Metal because it contains no organic materials, cannot cause smoke, fumes, or odors. *A little goes a long way*—costs 1/10¢ per foot of weld—saves up to three times its cost in time savings alone. Order a trial gallon ($3.25) on a no risk basis. If you're not completely satisfied we will cancel the invoice.

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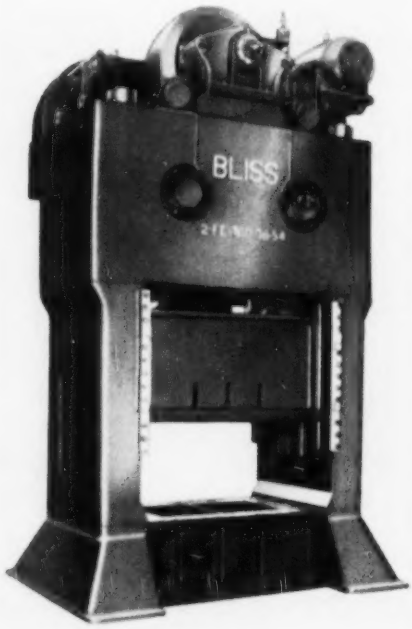
G. W. SMITH & SONS, INC., 5407 Kemp Road, Dayton, O.

New Shop Equipment

Press Intended for General-Purpose Blanking, Forming, and Drawing

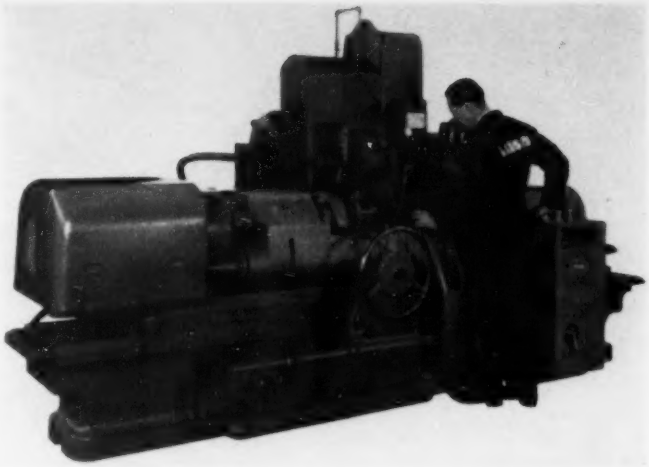
Development of a two-point eccentric press, designated as the No. 2-FE, for general-purpose blanking, forming, and drawing has been announced by E. W. Bliss Co., Canton, Ohio. To withstand the most severe round-the-clock operating conditions, the two main gear eccentric units are designed with unusually heavy sections and are mounted on and keyed to extremely large diameter shafts. Torsional and axial deflections are said to be practically eliminated by having the shafts revolve in crown bushings. Maximum rigidity is achieved through the use of short uprights and deep crown sections. Lubrication is provided automatically by means of a combination cascade and pressure system. The drive is double-geared, with two separate intermediate shafts operating in an oil bath.

The press is furnished with a fast-acting single-disc pneumatic friction clutch as standard equipment. This clutch, it is claimed, is cool-running and requires no adjustment since the clutch and brake plates are self-centering and wear on the



Bliss No. 2-FE Press

Landis Type DH Crankpin Grinding Machine



friction surfaces is compensated for automatically. Replacement of worn-out friction plates can be quickly and easily accomplished without disassembling the clutch or any part of the press. The brake is integral with the clutch and arranged to prevent engagement of both at the same time.

Crankpin Grinder Available in Swings of 16 and 25 Inches

Designated as the Type DH, an improved crankpin grinding machine announced by Landis Tool Co., Waynesboro, Pa., is available in swings of 16 and 25 inches and in lengths to accommodate 32, 42, and 72-inch crankshafts. Lubrication to the carriage and wheelbase ways is effected from a separate reservoir with pump and filter. A safety pressure switch prevents operation of the machine unless pressure exists in the system. The carriage ways are fully protected from dirt by telescoping covers which are said to keep the hand scraped ways protected regardless of the carriage position.

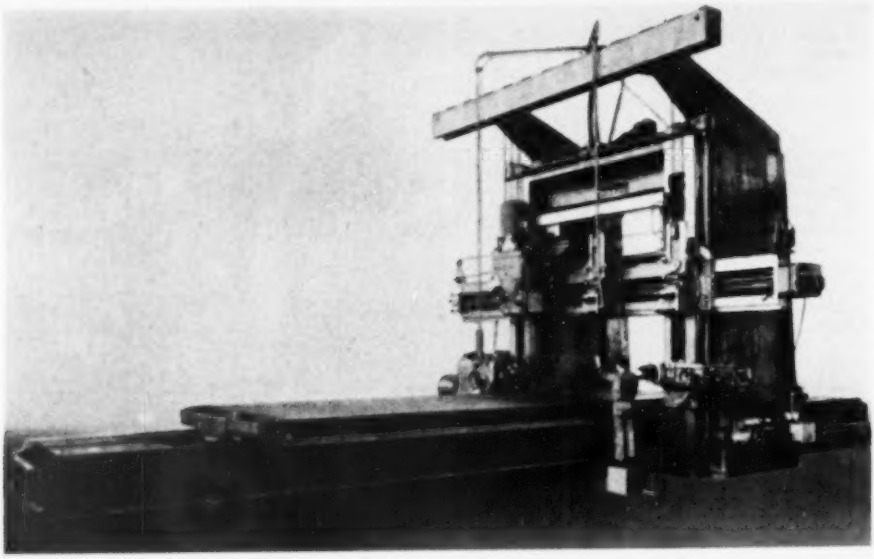
A new sensitive hand feed for the carriage is used for positioning the crankshaft laterally as the grinding wheel moves toward the work, thus permitting even grinding on each side of the crankshaft sidewall. The oil reservoir is fully enclosed, and facilities are provided for the quick filling and emptying of this reservoir, as well as gages to show the oil level.

Speeds of the hydraulic traverse are adjustable at the front of the machine. Separate controls are provided for positioning speed of the carriage and for both right and left-hand cushioning speeds. The Microsphere spindle bearings are lubricated by pressure. A separate reservoir for bearing lubricant is built into the wheelbase. This system is protected by the use of a pressure switch which prevents rotation of the spindle unless oil pressure exists in the bearings.

An overhead type hydraulically operated wheel dresser is available which permits dressing the wheel without changing the work setup. A compensating wheel feed for resetting the wheelbase to the correct position after dressing with the overhead dresser may be obtained as extra equipment. A variable speed motor to maintain correct surface speed of the wheel regardless of wheel diameter is also available. Automatic sizing is an optional feature.

Combination Planer-Miller Machines Huge Workpieces

Giddings & Lewis Machine Tool Co., Fond du Lac, Wis., has added to its Cincinnati Hypro line a combination planer and miller which is said to effectively handle work up to 10½ feet wide, 9 feet high, and 26 feet long. To increase flexibility, a right hand and left-hand planer head is mounted on the rail. These heads may be operated individually or simultaneously. In addition, a right-hand planer side head is used to afford the machine conventional planer advantages. The rail heads may be traversed to clear the entire table for a vertical milling head also mounted on the rail. Similar to the planer heads, the milling head may be swiveled to reach angular surfaces on the part being machined. A left-hand milling side head is provided to augment the regular machine functions. This head also swivels and is capable of reaching surfaces on the side of the workpiece. Both milling heads have a 10-inch quill and are individually powered with 25/50 h.p. two-speed motors. Each milling head



Cincinnati Hypro Combination Planer and Miller

has eight mechanical gear changes and with the two motor speeds mentioned will provide 16 spindle speeds.

The drive for feed and traverse to the table for milling operations is mounted on the right-hand side of the machine. This drive furnishes electronic feed to the table in infinitely variable increments from 1 to 60 inches per minute. A similar milling drive is mounted on top of the arch which supplies milling feeds to the milling head saddles of 1 to 40 inches per minute in infinitely fine increments. The electronic feed is also available to the cross rail in an up and down direction at a rate of approximately ¼ to 10 inches per minute. On the left side of the machine is mounted a 75/125 h.p. planer drive which supplies planer speeds to the table from 6.7 to 200 feet per minute. Speeds can also be controlled between these two limits in fine increments.

The planer side head and milling head side head are counterbalanced by weights inside the column. The left-hand rail milling head is counterbalanced with a special counterbalance arrangement and the weight of this head is fully removed from the rail. This is a traveling type of counterbalance with the balance weights located on the rear edge of the housings. The two planer rail heads have counterbalanced sides so that they can be raised and lowered easily.

Other features of the combination planer-miller include non-metallic table ways; forced lubrication to the table ways; complete herringbone gear table drive; dual rail control; centralized saddle control; precision adjustment handles; power cross feed to planer side head; separate pendant control for planing and milling operations; and many other standard Hypro features.

Compound Protects Metal Surfaces Against Corrosion

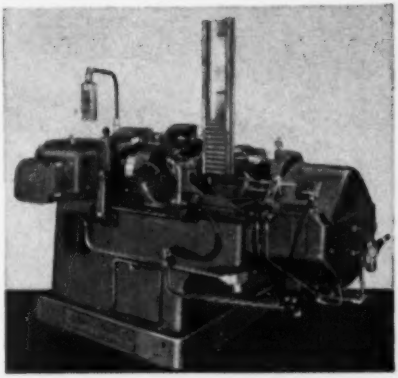
Known as Gulf No-Rust No. 6, a compound announced by Gulf Oil Corp., Gulf Refining Bldg., 3S-Z Gulf Bldg., Pittsburgh 30, Pa., is recommended for the protection of metal surfaces against corrosion in either indoor or outdoor exposure during domestic and overseas shipment and for either indoor or outdoor storage for long periods of time. The compound is described as a rust preventive of the thin film type which will provide an approximate surface coverage of 300 square feet per gallon. The compound, it is claimed, has no tendency to settle or separate in storage and, due to excellent adhesion, the coating, when once applied and dried, will not crack, chip, scale, or disintegrate at temperatures down to 0 deg. F. and will not flow at temperatures as high as 190 deg. Fahrenheit.

Gulf No-Rust No. 6 is suitable for application by brushing, spraying, or dipping and can be readily removed with Stoddard solvent, kerosene, or similar petroleum solvents. According to the manufacturer, the compound will deposit a coating not exceeding 8 thousandths of an inch in thickness by dipping at a temperature of 70 deg. F. and will dry sufficiently within four hours to permit handling without removal of the coating.

Automatic Nipple Threading Machine

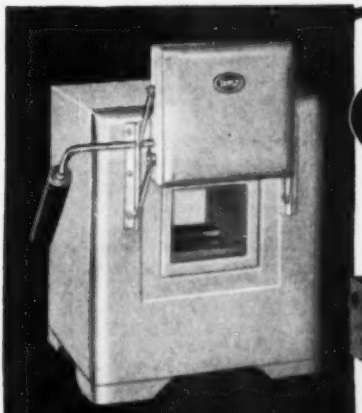
Designated as the "Landmaco" No. 2, an automatic nipple threading machine designed to thread, ream, and chamfer nipples in a continuous automatic operation has been announced by the Landis Machine Co., Waynesboro, Pa. The machine is said to be capable of producing commercial standard long nipples up to 6 inches in length and is available in two size range capacities; namely, ⅛ and ¾-inch range and 1 to 2-inch range.

The No. 2 machine is also available in an automatic close nipple threading type incorporating an attachment which allows for the production of commercial standard close, short, and special short nipples. This type is likewise built in two distinct size range capacities, as mentioned above.



Landis "Landmaco" No. 2 Automatic Nipple Threading Machine

The Landmaco No. 2 Automatic Nipple Threading Machine is furnished complete, in both types, with internal-trip pipe and nipple die heads with chaser holders, reaming attachments, magazines, cam segments, pipe grips, transfer



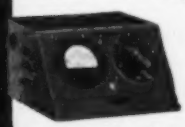
New improved design welded steel body—4½" dual insulation—uplifting counterbalanced door—heavy duty element embedded in all four sides of heating chamber.

TEMCO

SERIES 1600 ELECTRIC FURNACE

FOR HEAT TREATING TOOLS, DIES, PARTS AND GENERAL LABORATORY WORK.

Fast-heating, sturdy TEMCO model built for continuous use to 1750° F., intermittent to 2000° F. Supplied with either 500 series TEMCOMETER stepless temperature controller and indicator (illustrated) or with Model 292 electronic controlling pyrometer.



Model	Chamber W" H" D"	Volts 50/60 cy.	Furnace and Temcometer	Furnace and 292 Controller
1625	5½x4⅞x9	115	$161.00	$318.00
1620	5½x4⅞x9	230	161.00	318.00
1635	5½x4⅞x13½	115	195.00	350.00
1630	5½x4⅞x13½	230	197.50	350.00

Write for new handy Reference File and dealer's name

THERMO ELECTRIC MANUFACTURING CO.

488 Huff Street, Dubuque, Iowa



More Than

1000 SIZES

Carried in Stock



Reltool End Mills are made... and available from stock . . . in single-and-double-end types, in small and large diameters, with 2, 3, and 4 flutes, with straight or ball ends, in over 1000 stock sizes.

Precision processed of finest High Speed steel, Reltool End Mills are scientifically heat-treated for long cutting life. Order direct or through your industrial distributor.

THE RELTOOL LINE INCLUDES:

Arbors • Center Drills • Counterbores • Die Sinking Cutters • Dovetail Cutters • End Mills • Form Tools • Gear Cutters • Hollow Mills • Keller Cutters • Key Seat Cutters • Lathe Mandrels • Metal Slitting Saws • Milling Cutters — all types • Reamers • Spotfacers • Step Drills • Taps • Tool Bits • Specials.

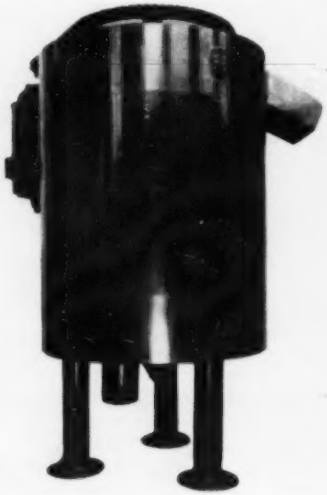
Reltool CORPORATION
RELIABLE METAL CUTTING TOOLS

4540 W. BURNHAM ST. • MILWAUKEE 46, WIS.

fingers, plunger bars, and spindle speed gears for one size of nipple. The machine incorporates a one-piece bed with hardened and ground steel ways which are protected by telescopic sheet-steel chip guards.

Magnetic Coolant Separator

The accompanying illustration shows the "Memco" Magnetic Coolant Separator developed by Magnetic Engineering & Mfg. Co., Dept. MMS, Clifton, N. J.,



"Memco" Magnetic Coolant Separator

which is designed to remove ferrous particles from cutting and lubricating oils. It can also be used for other applications where magnetic material is to be separated from a liquid or non-magnetic material.

The separator is available in standard sizes ranging from 18 inches o.d. having a capacity of approximately 40-60 gallons per minute of feed to 60 inches o.d. having a capacity of approximately 250-300 gallons per minute. The material to be separated is fed into a pipe at the bottom of the unit. Magnets arranged around the circumference of the separator attract the magnetic particles, and the non-magnetic material flows out near the top of the unit down through a center opening and out of another pipe at the bottom. The magnetic particles are propelled upward inside the separator and discharged through a spout near the top.

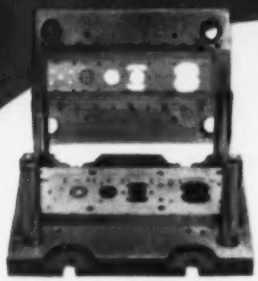
160 pieces a minute to tolerances of less than .0005"!



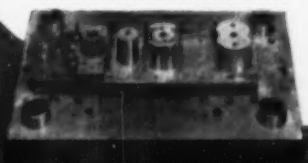


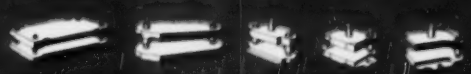
they built the die in a

DANLY PRECISION DIE SET



Die built by the Sherman Tool & Die Co., Charlestown, Massachusetts, for the Signal Manufacturing Co., Lynn, Massachusetts, in a Special Danly Precision Die Set



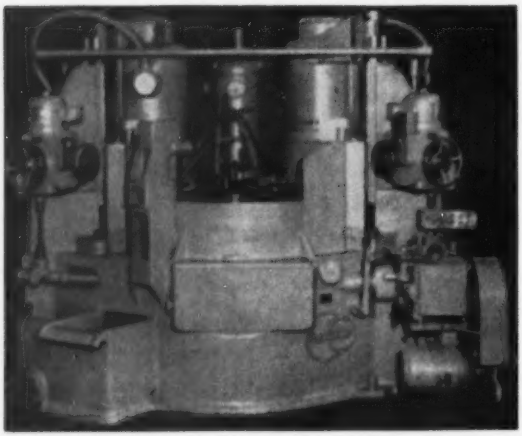


Danly precision makes every Danly Die Set a reliable base for the finest die work. They save time in the die shop because they are square and true . . . they assure longer production runs in the press because precision closure protects die components.

Standard Danly Die Sets are quickly available from a nationwide system of completely stocked assembly branches. Just phone for fast delivery, and for the finest in die set precision, always specify Danly.

DANLY MACHINE SPECIALTIES, INC.
2100 South 52nd Avenue Chicago 50, Illinois

DANLY



Blanchard No. 16A3 Vertical Spindle Rotary Table Surface Grinder

Surface Grinder Equipped with Three Spindles

The Blanchard Machine Co., 64 State St., Cambridge 39, Mass., has developed a verticle spindle rotary table surface grinder, identified as the No. 16A3, which can be equipped with a 40-inch diameter magnetic chuck or a plain table to accommodate a fixture to hold non-magnetic work or pieces of irregular shape. The maximum swing of work or fixture is 49 inches.

The grinder is equipped with three abrasive wheels, all of which can be set to grind the same surface when stock removal is heavy or very accurate tolerances for dimension or surface finish are required. If desired, one spindle can be set to grind surfaces at the same or different height at a different distance from the center of the chuck. As shown in the accompanying illustration, the grinder is equipped with two spindles driven by 30 h.p. motors and one spindle driven by a 15 h.p. motor. The unit is provided with a 24-station fixture, arranged for automatic clamping and releasing, for use in grinding connecting rods with wrist pin boss at an offset height.

IT *Multiplies* TOOL LIFE

If you use a Ziegler Tool Holder, you'll get longer service from taps and reamers—for a very simple reason.

When work comes through faulty, the blame is usually placed on the tap or reamer, whereas the trouble often lies in the fact that the work is not properly aligned with the spindle.

Before discarding the tap or reamer, try using it in a Ziegler Tool Holder which automatically compensates for inaccuracies up to 1/32" radius or 1/16" diameter. You'll find that it will enable you to cut down considerably on your tool bill.



Types to fit any machine used for tapping or reaming

Ziegler FLOATING HOLDER for Taps and Reamers...

W. M. ZIEGLER TOOL CO.

13566 AUBURN
DETROIT 23, MICH.

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The Logical First Milling Machine

When you decide to buy your first Milling Machine, make it a Sheldon. This moderate price machine tool can be bought as a basic machine that will come within your budget . . . available with power or hand feed; with or without back gears.

Sheldon Milling Machines are rigidly built for continuous, precision service. The spindle is supported in double row Timken Taper Roller Bearings. Fully enclosed variable drive, spindle range 100 to 1100 r.p.m. (with back gears, speeds from 25 r.p.m., up). Tapered gibs throughout.

Write for complete Catalog which includes specifications and attachments

Available Accessories and Attachments

Power Feed — **Universal Head**
Dividing Head — **Coolant System**
Rotary Table — **Swivel Vise**
Drip Pot Oiler

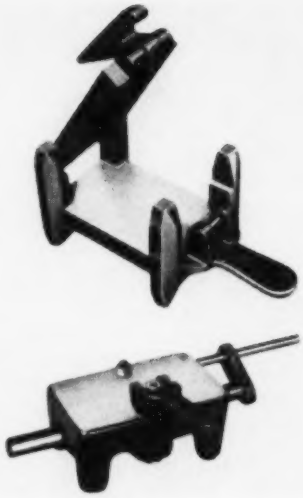
SHELDON
CHICAGO

SHELDON MACHINE CO., Inc.

4250 N. KNOX AVE. CHICAGO 41, ILL., U.S.A.

Drill Jigs Can Be Machined to User Requirements

Franklin E. Smith & Associates, 6201 Carmelita Ave., Bell, Calif., is offering, under the trade name of "Parlec," a unique basic drill jig which enables the user to easily machine the base for properly locating the part to be drilled, cut holes in the cover, and insert bushings to complete the design of jig required. The unit is sturdily constructed of nickel iron and normalized, with the top, bottom, and both sides of the jig frame and cover finished.



(Above) "Parlec" Box Drill Jig in open position. (Below) "Parlec" Drill Jig for round stock with part in jig ready for bushings.

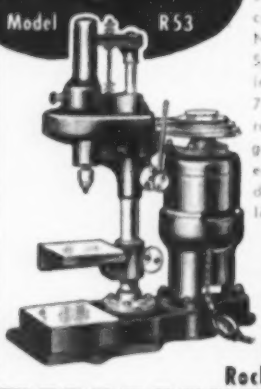
The Parlec Box Drill Jig is available in five standard sizes of 1½ x 2, 3 x 3½, 3½ x 5¾, 6 x 6, 1½ x 6 inches. Jigs of special sizes can be furnished on order. Master layouts are supplied at no additional cost, which, when placed under a drawing of the part to be drilled, enable the part designer to readily specify the size of jig to be used for drilling the particular part.

Also available is an adjustable round stock drill jig which is made in three sizes for handling work from ¼ to 2 inches in diameter. Any desired number of bushings may be added to this jig to meet the requirements of the job at hand.

Sensitive, Precise, Accurate

An accurate precision drill of highest quality—sturdily built—and so sensitive that operator actually "feels" its progress and avoids many small drill breakages. Built for ANY precision drilling from No. 80 to ¼ inch. Spindle travel 2¼ inches. Speed range 750 to 6,000. Accurate adjustable depth gauges. Bench or Pedestal type. Write today for full data and literature.

HIGH-SPEED Drilling Machine Model RS3

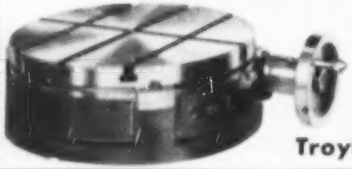


HIGH SPEED Hammer Co., Inc.
807 Norton St.
Rochester 21, N.Y.

NO MORE COSTLY JIGS

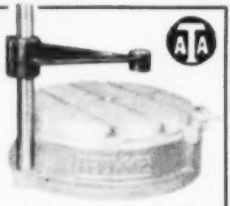
on small production jobs with

TROYKE WORM WHEEL OPERATED TABLES



Sizes:
9 - 12 - 15 -18 - 21 - 25

See your dealer or write for Catalog No. 17, fully illustrated, showing all models and applications to various work.



Drilling attachments can now be furnished for Worm Wheel Operated Tables.

Troyke Mfg. Co., Inc., Cincinnati 9, Ohio, U.S.A.

PRODUCTION goes up

SPOILAGE goes down

with this Procunier High Speed Tap Head

Today you must **speed** up your **production schedules** . . . and at the same time **reduce spoilage!** The Procunier High Speed Tapping Head is precision-built for faster, consistently accurate production tapping. A host of exclusive Procunier feature enables you to maintain cleaner, sharper threads . . . with fewer broken taps, fewer spoiled pieces—even on accelerated production runs.

HERE'S WHY: Tap driving pressure is **automatically regulated** by the amount of pressure applied to the unique Procunier friction clutch. Operators quickly learn to detect dull or "loaded" taps just by the pressure needed to drive them! This increased sensitivity enables even "green" operators to do more accurate tapping. "Blind" hole tapping may be done as easily as through tapping! WRITE TODAY for brochure giving full details and specifications on Procunier High Speed Tap Heads. Also Available—**NEW! Procunier "TAP KING"** for **large hole** tapping. Capacity 3/8" to 1" in steel; 1 1/8" in softer metals.



Exclusive! PROCUNIER "Tap Saver"

The exclusive Procunier "Tru-Grip" tap holder is lighter, smaller in diameter. It affords easier tapping close to walls or shoulders, eliminates "chewed" tap shanks. Holds tap true.

Procunier

Safety Chuck Company

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PROCUNIER SAFETY CHUCK CO., Dept. 4
12 S. Clinton St., Chicago 6, Ill.
Gentlemen:

Please send your illustrated brochure giving complete details, specifications and prices on the improved line of Procunier High Speed Tapping Heads.

Name .....

Address .....

City ..... Zone ... State .....

Single-Stroke Pneumatic Marker

Ingot, cut, heat, and weight numbers or letters can be stamped at the same time on steel ingots, billets, bars, and other hot metal products with a single-stroke pneumatic marker developed by The Pannier Corp., 202 Pannier Bldg., Pittsburgh 12, Pa. Known as the "Master Marker," the unit has an automatic head trip, holds up to 13 interchangeable ¼-inch grooved steel type characters, and weighs 100 lb. The marker is operated from a ¾-inch 80 to 100-lb pressure air line and is mounted on a life-lubricated carriage and wheels for angle-iron, channel, or beam support.

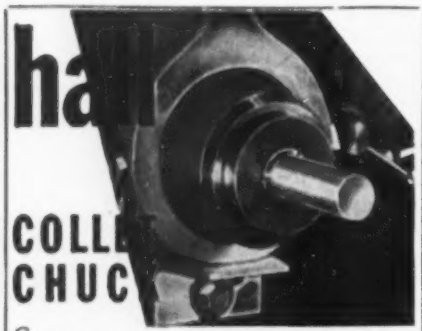


Pannier "Master Marker" Single-Stroke Pneumatic Marker

A long handle is said to keep the operator a safe distance from hot work. Individual cartridges, holding single-line type setups, slide into and are firmly held by the slotted headplate, which is hinged at the top and locks at the bottom. Heads and type are custom-made to user's specifications.

Circular Sawing Machine

Designated as the Model OO-G, a circular sawing machine designed for fast and accurate square or angular cutting-off operations on ferrous or non-ferrous materials up to 3 inches round or square has been announced by The Motch & Merryweather Machinery Co., 715 Penton Bldg., Cleveland 13, Ohio. Angular cutting up to 45 degrees is said to be possible on the machine. Stock can be fed into the machine either manually or by means of an automatically-operated air-powered stock feeder for standard lengths up to 24 inches. Special gaging and holding fxtures for odd shaped ex-



COLL
CHUC

SPEED UP production in multiple operations with push-out type Hall Collet Chuck. Full spindle capacity or over. Tremendous grip over or under stock size to .007—without adjustments...no bearings, friction, heat or loss of power. Instant release without stopping lathe.

2-inch capacity, $145; *3-inch capacity*, $295; *4-inch capacity*, $95

Round, square or hex collets, plain—serrated

HALL MANUFACTURING COMPANY
622 Tularosa Dr., Dept. B, Los Angeles 26

"OLIVER" 30-inch Metal Cutting BAND SAW

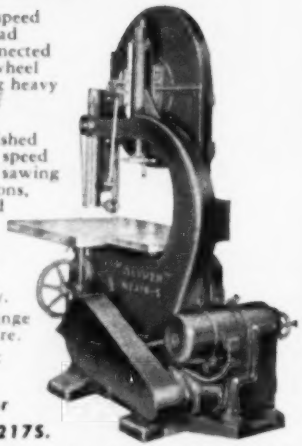
Has low speed geared head direct connected to lower wheel for cutting heavy sections of metals.

Also furnished with high speed motor for sawing compositions, woods and sheet metals.

Powerful. Cuts true and steady.

Quick-change rim and tire.

Automatic brakes.



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Oliver Machinery Co., Grand Rapids 2, Mich.

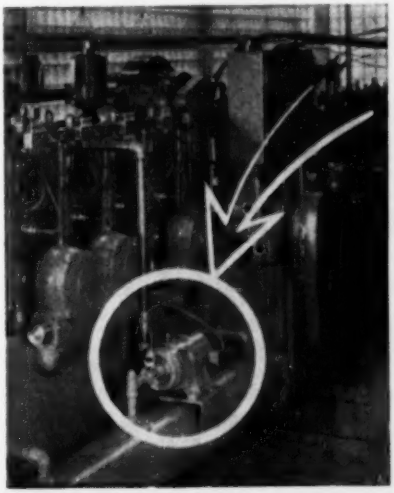
EXTRA SAVINGS



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FULFLO COOLANT PUMPS

An installation by The American Electric Fusion Corporation.



Hard-to-get tools must be nursed like babies with production demands at all-time highs.

Keep 'em cool and turn out more and better work with proper coolants brought to the right spot by FULFLO COOLANT PUMPS.

Pipe sizes 3/8" to 1 1/2".

Motor, direct or belt drives.

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THE FULFLO Specialties Co., Inc.
BLANCHESTER, OHIO

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Upper Drives
Lower Drives
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Slip Spindles
Bracket Spindles



Spindle Extension Assemblies

Morse Taper Adapters With and Without Set Screw Slots

Shur-Lock Micro Nuts

Consult SEIBERT engineers before retooling or replacing parts on multiple spindle machines.

(New Low Prices)

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6" and 15 mm. scale

Hardened Jaws

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Guaranteed Accuracy

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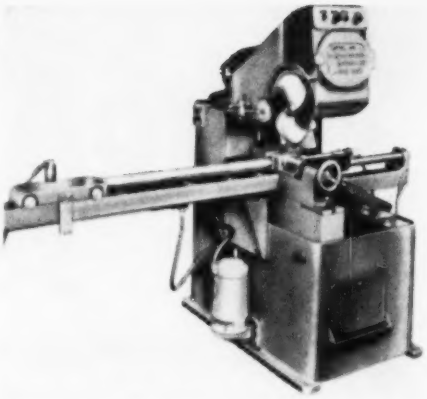
f.o.b. New York

For details on other imported calipers and micrometers write

KARL A. NEISE

Dept. MMS

381 Fourth Ave., New York 16, N. Y.



Motch & Merryweather Model 00-G Circular Sawing Machine

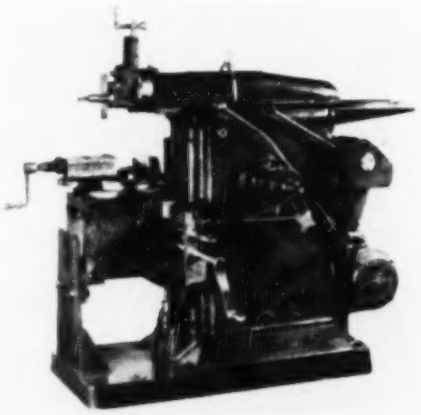
trusions and intricate parts can be easily adapted to the machine.

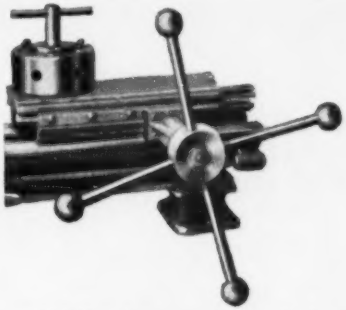
The gravity feed of the one piece saw head is controlled by means of a conveniently located hydraulic flow control valve. The saw blade is driven by the direct-drive geared saw head, and changes in sawing speeds are made by means of pick-off gears.

Shaping Machine

A high-speed floor model shaping machine with a 14-inch stroke, 16 inch ram, and four speeds varying from 27 to 140 strokes per minute is now being mar-

DCMT Shaping Machine





LYNN is on the Job

The same, *but improved*, Lynn Replacement Turrets as used during the last war, are again available. Note the BT-2 Heavy Duty, Self-Indexing, Conversion Bed Turret with Pilot Wheel, as illustrated. *LYNN* conversion Turrets are working on Engine & Turret lathes of all makes. *We build to fit your needs.*

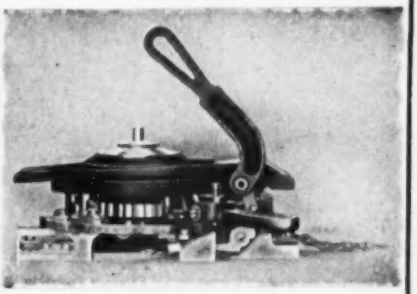
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Machine Tool Division,

LYNN MANUFACTURING CO., Inc.

1121 S. Seventh St., Minneapolis, Minn.

AUTOMATIC CHUCKING AND INDEXING FIXTURE



1.—1800 light cuts per hour.
2.—Either horizontal or vertical position.
3.—Collets changed instantly.
4.—Automatically knocks piece out.
Model D—Ratchet indexing only—1" cap.
Model E—Both degree and ratchet indexing —Capacity up to 1".
Model F—Both degree and ratchet indexing —Capacity up to 2¼".

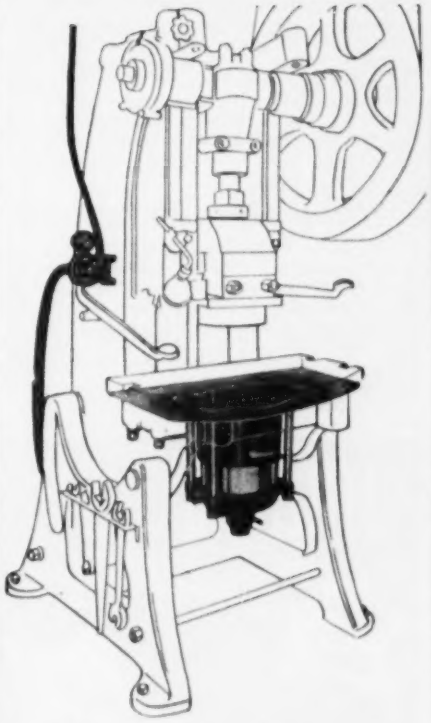
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DIE CUSHIONS

for all

PUNCH PRESS REQUIREMENTS



Adaptable to all deep drawing operations and all pressure pad control on forming dies.

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DAYTON ROGERS
Manufacturing Company

Minneapolis 7, Minnesota

keted by the DCMT Sales Corp., Dept. M-5, 164 Duane St., New York 13, N. Y. Both the base and body of the machine are of heavily cast and sturdy construction, internally ribbed to ensure maximum rigidity. The ram slides are constructed of V-section with large bearing areas and adequate cross section to resist cutting stresses. Measuring 14 x 10 inches overall, the table is of box-section with machined T-slots and a strong adjustable table support. Adjustable gibs and felt wipers are fitted to all slides.

The machine is driven from a self-contained motor mounted on an adjustable stool, the power being transmitted by three V-belts through a matrix multiple-disc friction clutch to a totally-enclosed four-speed box.

Heavy Duty Coolant System

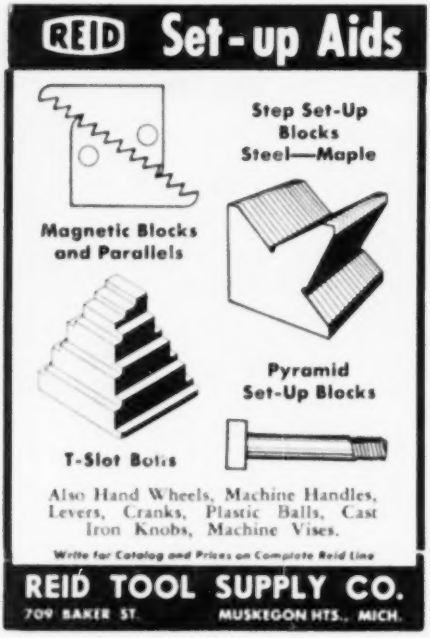
Available in gear or centrifugal types, a self-contained coolant system designed for converting milling machines, lathes, drill presses, grinders, and so on, to wet cutting machines has been announced by the Graymills, Corp., Evanston, Ill. The unit can also be used for circulating coolants through welding machines, tap disintegrators, and for applying lubricants to stock on punch press operations.



Graymills Heavy Duty Coolant System in use

The unit is available with a 1/25, 1/12, ⅛, ¼, or ½-h.p. motor which is totally enclosed and contains grease-sealed ball bearings.







* WHO

looks more like a busy, little beaver than a wise, old owl these days. But WHO* is still—

Wm. H. Ottemiller* Co.

of YORK, PA.

Even though the need for our precision, "milled-from-the-bar" screw machine products has us virtually snowed under—we invite inquiries from those of you who must have "the best."

KEEP YOUR "MIKES" ACCURATE



WITH

SCHERR OPTICAL FLATS

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- .0125 DIFFERENCE IN THICKNESS FOR MIKES

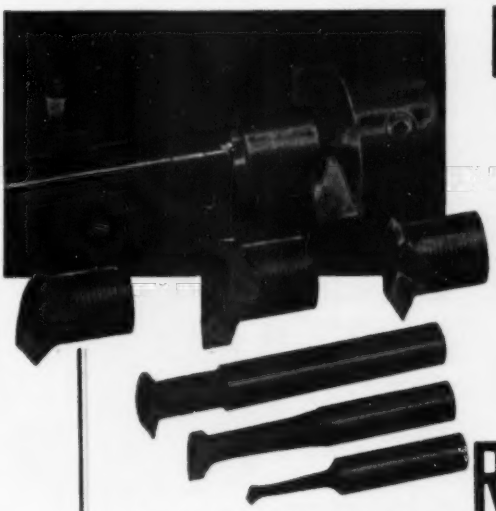
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COMPLETE LINE OF PRECISION INSTRUMENTS

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Has only to be resharpened by grinding top face.

The boring tools are made of super-high-speed steel or carbide tipped.

BORING TOOLS

WITH *EXTRA* ADVANTAGES!

All styles

- for general boring
- for bottoming and facing
- for internal threading

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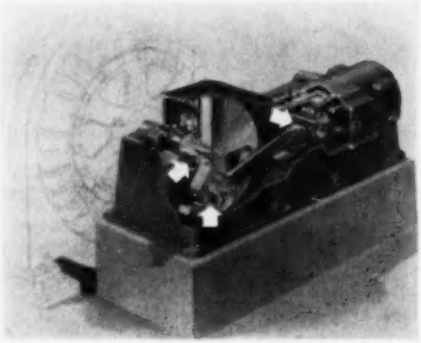
Hartsdale, N.Y.

Motor-Driven Compressor Features Anti-Friction Roller Bearings Throughout

Identified as the Class O-CE, a horizontal duplex motor-driven compressor utilizing anti-friction roller bearings throughout to provide for cool operation, maximum lubrication, and high efficiency has been announced by Chicago Pneumatic Tool Co., 8 E. 44th St., New York 17, N. Y. Spherical roller main bearings support the crankshaft and are also used at the crankpin end of the connecting rod; double row needle bearings are used in the crankhead end of the connecting rod.

Class O-CE air and gas compressors are direct driven by engine type synchronized motors located between the compressor frames. The motor rotor is mounted directly on the crankshaft, providing a compact and efficient drive. Cylinders are double-acting and equipped with CP Simplate valves. The cylinders are provided with liberal water jackets and are mounted on heavy duty totally-enclosed vaporproof frames. Capacity regulation and lubrication are said to be simple and foolproof, yet completely automatic.

Standard sizes of O-CE two-stage compressors are available in capacities of 350 to 10,000 c.f.m. Other sizes and types are available for higher and lower pressures.



Cutaway view of Chicago Class O-CE Horizontal Duplex Compressor showing spherical roller main bearings, spherical roller crankpin bearings, and heavy duty needle bearings at crosshead

Accurate Hole Transfer Made Easy With

NIELSEN TRANSFER SCREWS

Simply insert in holes, invert, strike sharply and you have centers and drill circles perfectly located. Reduce time and eliminate spoilage of other methods. 8 sizes, from 3/16" to 3/4" U.S.S. Inexpensive — Last for years.



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RADIUS DRESSER $34.00
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Special Size Angle and Radius Dressers Made to Order. Send for Quotation.

Hardened shaft—Bearing adjustable for wear. Diamond always perfectly centered. Easily set adjustable 180° stops.

10" Wheel size for DoALL and NORTON Grinders—$39.00. Diamond $7.00.

SPECIAL 14" Wheel Size $89.00

First low cost high precision Angle Dresser on the Market. Can be set very accurately with a Protractor. Works underneath the wheel. Large bearing surfaces.

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RED-E-TOOLS

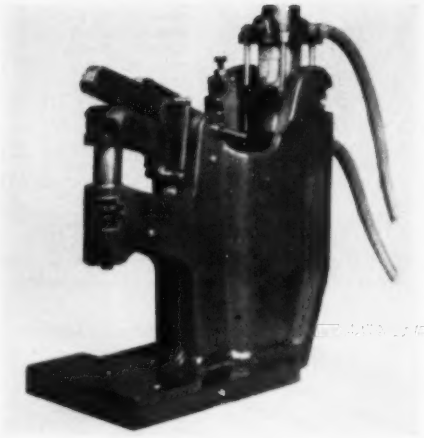
READY TOOL COMPANY

540 Iranistan Ave. Bridgeport 5, Conn.

Machine Designed for Staking or Riveting Fixed or Movable Joints

Designated as the Model No. 1B, an air-operated staking machine introduced by High Speed Hammer Co., Inc., 307 Norton St., Rochester 21, N. Y., is expressly designed for staking or riveting fixed or movable joints. Useful for such operations as eyeletting, inserting grommets, burring, and pointing with platinum, tungsten, or silver, the machine is furnished with an air foot switch; however, dual hand controls can be furnished on order if desired.

An outstanding feature of the machine



High Speed Model No. 1B Air-Operated Staking Machine

is its double action. The spindle is constructed with a pressure pad which compresses or assembles the work prior to staking. The weight of the hammer blow is readily adjustable to meet the requirements of the job at hand. The trip-dog action of the unit is said to ensure a uniform blow regardless of slight variations in stock thickness.

According to the manufacturer, the machine is constructed for easy operation, thus minimizing operator fatigue, and provides for a production of over 1,000 pieces per hour.

Shaper Takes Heavy Cuts with Accuracy

A full-hydraulic high speed shaper suitable for a wide variety of applications and designed for taking heavy cuts with



STANDARD D - 4 Abrasive Band Grinder

Famous for Stamina

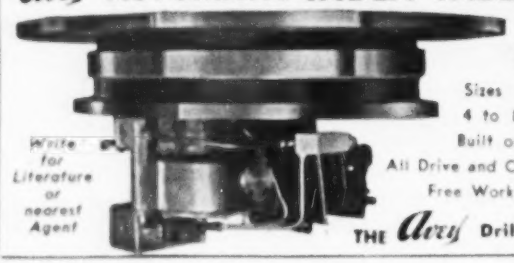
This new, streamlined bench type grinder assures fast, quality finishing on metals, plastics, wood, fibre . . . at low cost. Built to machine tool specifications, Standard D-4 is equipped with improved band tension control and specially designed protective motor hood. 4x36¼" band. The ideal portable unit.

OTHER STYLES AND SIZES IN NEW MANUAL ON FINISHING—WRITE TODAY

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Avey AUTOMATIC INDEX TABLE Meets Demand for DRILLING and TAPPING EQUIPMENT

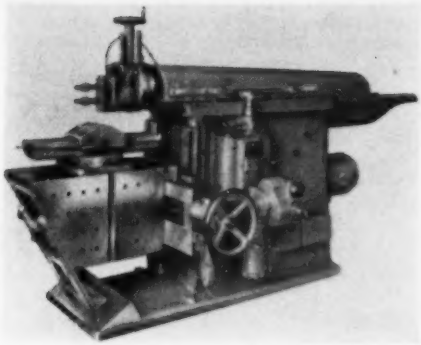


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Sizes 24", 30", 36" Tables Interchangeable. 4 to 18 Indexes. Entire Unit Self-Contained. Built on Unit Construction Principle.

All Drive and Control Mechanisms underneath Table for Free Working Surface • Easy Accessibility!

THE Avey Drilling Machine Co., Cincinnati 1, Ohio



Klopp Full-Hydraulic High Speed Production Shaper

accuracy is now being marketed under the trade name of Klopp by Klingelhoffer Machine Tool Co., 20 Prospect St., Westfield, N. J. The drive is effected from an electric motor with high overload capacity, directly coupled to a high pressure pump which actuates the plunger of the ram in combination with a suitable control mechanism. The ram speeds are infinitely variable in two ranges, one of which enables the heaviest cuts to be taken, while in the other range, the pressure is reduced to allow higher cutting speeds.

The desired rates of feed for the table and toolslide are obtained by means of graduated scales. The table feed is actuated hydraulically at the rear reversing point of the ram stroke and is finely adjustable from 0.008 to 0.12 inch. The table travel can be stopped at any point between the two end positions by means of two adjustable limit switches and an electro automatic cutout. The table can be fed in both directions either by hand or by hydraulic power or by a fast traverse motor. The toolholder is arranged to swivel 45 degrees to either side and is fitted with a graduated scale. The toolslide has a self-acting downfeed which is automatically released in the lowest position to avoid jamming. The work table swivels and is detachable and can be set to the desired angle by means of a graduated scale.

The shaper is available in three hydraulic models having 26, 34, and 40-inch maximum strokes. It can also be obtained in four mechanical models with 12, 17, 20, and 26-inch strokes.

WESTLEN Adjustable Self Centering REELS

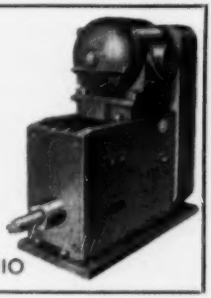
For feeding strip and wire coil stock to presses. Coil capacity 300 to 500 lbs. Outside ring dia., 28" to 36". Height of reel, 36". Wheel automatically adjusts parts to suit inside diameter of coils from 11" to 20". Arm allows for quick conversion to horizontal or vertical position and adjusts height of reel.

Write for prices and literature.



The RULETA Co.
27 WARREN ST. NEW YORK 7.

Avey AUTOMATIC UNIT for DRILLING • TAPPING
REAMING • HOLLOW MILLING and DEEP HOLE DRILLING
Vertical, Horizontal or Angular Mounting.
Made in two sizes . . . No. 1 & No. 2 Morse Taper.
Here's a package unit . . . that will simplify your
HIGH PRODUCTION PROBLEMS. Write for details.
THE Avey DRILLING MACHINE CO., CINCINNATI 1, OHIO



Furnace Control Panel

To facilitate installation of its "Temco" line of electric furnaces, Thermo Electric Mfg. Co., 488 W. Locust St., Dubuque, Iowa, has announced a wired control panel which is designed for attaching to the furnace body. The panel is available with several sizes of furnaces and houses a temperature controller together with load carrying relay, thermocouple lead, and fused disconnect switch. Electrical wiring of all these parts is complete; the user has only to attach the panel to the furnace with screws provided and make two simple connections to the furnace and one to the electric line. Either a fully automatic electronic pyrometer-controller or a manually operated controller-indicator may be used in the control panel.



"Temco" Electric Furnace with Prewired Control Panel

T. H. LEWTHWAITE MACHINE CO.



METAL LATHERS' BENDER

This machine will bend up to ⅛" square or round iron, 2" x ⅛" channel iron, 2¼" x 5/16" flat iron cold. Weight 40 lbs.

Circular on Request

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"SHUR-GRIP" DROP FORGED HANDLES

Designed to hold 3 to 6 lb. lead hammer heads more firmly—will not slip—keeps hammer head in shape longer—to make remolding easier, quicker, surer, less expensive. Write for folder.

LAWRENCE H. COOK, INC.
67 Massasoit Ave. E. Providence 14, R. I.

Portable Tracer-Guided Etching Machine

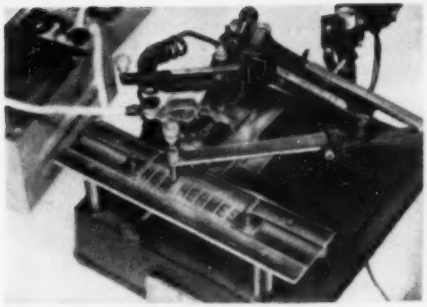
Designed for marking hardened steel, its alloys, and other ferrous metals, a portable tracer-guided etching machine, which is a specially adapted model of the company's "Engravograph," is now being offered by New Hermes, Inc., 13-19 University Place, New York 3, N. Y. The depth of etching can be easily controlled from very light to heavy by an adjustable heat regulator. The Engravograph com-



for rapid threading
OF SCREW BLANKS AND SIMILAR PARTS
The KENT 2-Spindle BOLT THREADER

Alternate feeding to two spindles. Continuous operation. Large output. Low Costs. Change-overs made quickly. Minimum skill required.
Write for illustrated literature.

The KENT MACHINE CO., Cuyahoga Falls, O.
Drillers . Threaders . Slotters . Countersinkers . Bar Pointers



New Hermes "Engravograph" Portable Tracer-Guided Etching Machine

bines engraving and electric etching and utilizes an adjustable tracing arm which permits the marking of 15 different sizes from a single master template.

The unit is said to be ideally suited for the marking of tools, dies, bits, gages, punches, fixtures, and other extremely hard surfaces which cannot be readily engraved or stamped.

Magnetic Base Lamp

Enco Mfg. Co., 4522 W. Fullerton Ave., Chicago 39, Ill., has announced improvements in its "Handi-Lite" Magnetic Base Lamp which can be mounted on any iron or steel surface and utilizes a powerful Alnico permanent magnetic base with a 50-lb. magnetic pull. A universal ball and socket and swivel arm supports the lamp and permits positioning of the light at almost any angle. The adjustable shield of the lamp is coated on the outside with a special rayon coating, thus allowing the operator to work

Enco "Handi-Lite" Magnetic Base Lamp in use





You had better let the boss see this little fellow . . . he knows something . . . he knows how to make more holes per dollar invested . . . That's important, today. He's high quality . . . and designed to do a specific job. Wood & Spencer have gone as far as possible in experience and sound engineering, to produce a tap that all but talks. With a machine operator's craftsmanship and a tap with a Wood & Spencer diploma, you have a combination that will make any cost-minded production man "Tap-Happy."

THE RIGHT TAP AT THE RIGHT TIME

The Wood & Spencer Company
Cleveland 3, Ohio

close to the shield without the danger of being burned by the heat transmitted from the 40-watt bulb to the shield.

The Handi-Lite is available in two models, one of which includes a "Miti-Mite" magntetic base indicator holder.

Portable Bar Racks

Portable heavy duty bar racks designed for efficient handling and storage of steel bundles by one-man operation have been announced by the Palmer-Shile Co., 16022 Fullerton St., Detroit 27, Mich. Use of this equipment enables the operator to place bundles in racks for storage in tiers, any rack being accessible for the selection of material desired. Units are of all-steel welded construction, built to any capacity.



Palmer-Shile Portable Heavy Duty Bar Racks



GRAY TURRET HEAD METAL CUTTER OR NIBBLER

N.A.M. Pioneer Award Given to Gray

Most modern Nibbler for Template Cutting, Tool Rooms, Shipbuilding, Aircraft Parts, Aircraft Tubing, Sheet & Plate Shops.

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MILWAUKEE

DIE FILERS

PROFILE GRINDERS

Cut Production Costs!



DIE FILER

Model FS with new All-Purpose, Deep-Throated Overarm performs all tool and die-making operations efficiently, at low cost.

PROFILE GRINDER

Available in two models — STANDARD and HIGH SPEED . . . for mounted stone wheels and diamond or carbide wheels respectively.

RICE PUMP & MACHINE CO.

226 N. MILWAUKEE ST.

GRAFTON, WISCONSIN

Hitch Feed Handles 0.003 to 0.050-Inch Thick Material

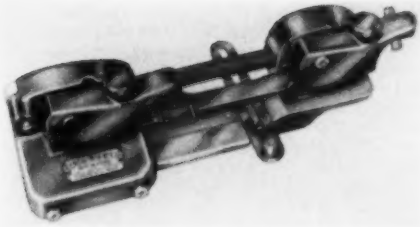
Introduction of a 2½-inch hitch feed for feeding coiled material from 0.003 to 0.050 inch in thickness has been announced by H. E. Dickerman Mfg. Co., 322-919 Albany St., Springfield, Mass. Designed for ease of mounting on any press or to the die set, the unit is said to handle the feeding of intricate multi-station progressive dies, as well as simple blanking and pierc-

. . . for more than 1001 jobs



HJORTH LATHE & TOOL CO.

8 BEACON STREET WOBURN, MASS.



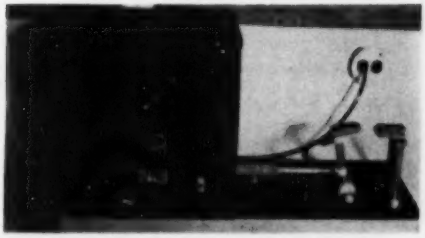
Dickerman 2½-Inch Hitch Feed

ing dies, without buckling of the stock. No tools are required to make adjustments for gripping pressure or feed length, and the design is claimed to automatically maintain the proper gripper plate angle.

Production Soldering Tool

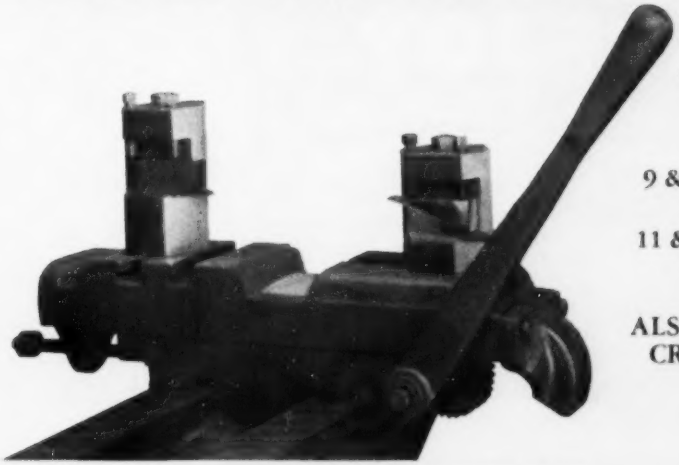
Luma Electric Equipment Co., P. O. Box 132—MS, Toledo 1, Ohio, has announced a solenoid operated resistance type soldering tool which can be used for various kinds of soft soldering and silver braze operations. Especially adapted for sweating operations and terminal connections, the unit includes electrodes which are solenoid operated and controlled by a foot switch, thus allowing the operator complete freedom of the hands in order to position the work and apply solder.

The unit illustrated is a 2500-watt capacity tool equipped with a selector switch that provides instant temperature control at six different settings to suit the job at hand. The unit can be furnished with one, six, or ten stages of heat control.



Luma Production Soldering Tool

GLOBE HEAVY DUTY CROSS SLIDES



WITH STEEL TOOL POSTS

FOR
9 & 10" LATHES
$59.75
11 & 12" LATHES
$64.75

ALSO CARRIAGE CROSS SLIDES

Prompt Delivery

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GLOBE PRODUCTS-HEAT SEAL CORPORATION

3380 Robertson Boulevard • Los Angeles 34, California, U. S. A.

Lubricator for Air-Operated Equipment

C. A. Norgren Co., 235 Santa Fe Dr., Denver 9, Col., has announced the Norgren "Micro-Fog" Lubricator which is adaptable to a wide range of industrial applications, including the lubrication of high speed parts, uniform lubrication of multiple devices, duplication of extremely close fitted, moving parts, and operations in which a minimum quantity of oil is permitted.

The lubricator is designed to break down each drop of oil into extremely fine particles of uniform size—two microns or less in diameter. The fog is created in the oil bowl. Particles of oil larger than two microns in diameter return to the oil supply and those of this and smaller size are carried over into the air stream. Approximately 5 per cent of the oil flow seen in the sight feed glass is converted into the true fog which is carried into the air stream. In this manner, the oil can be metered to as little as one drop per 20 minutes, as required. Since the fine oil particles remain in suspension, multiple units in simultaneous operation can be lubricated uniformly, it

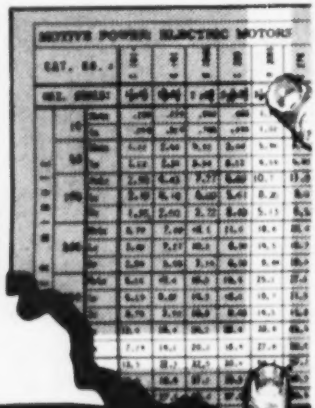


Norgren "Micro-Fog" Lubricator

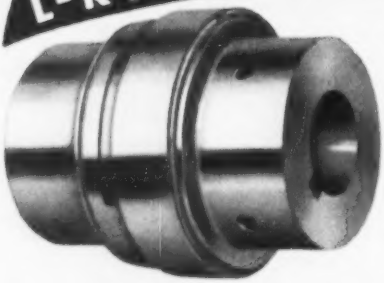
is claimed by the manufacturer.

The lubricator is available in models to function over a complete range of from 1 c.f.m. at 10 p.s.i. up to 14 c.f.m. at 80 p.s.i. It is completely automatic, starting to lubricate the moment air flows and stopping when the tool or machine stops.

A BETTER WAY
TO FIGURE AND SELECT FLEXIBLE COUPLINGS... THE
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TELL YOU EXACTLY WHAT COUPLING YOU SHOULD USE!



LOVEJOY
L-R FLEXIBLE COUPLINGS



are easy to install. No lubrication needed. No teardown for changing cushions.

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LOVEJOY FLEXIBLE COUPLING CO.
5007 W. LAKE ST. CHICAGO 44, ILLINOIS
Also mfrs. of Lovejoy Universal Joints & Variable Speed Transmissions

Speed Control Valve

Known as the "Flo-Set," a speed control valve suitable for the control of air, water, or oil with maximum pressure up

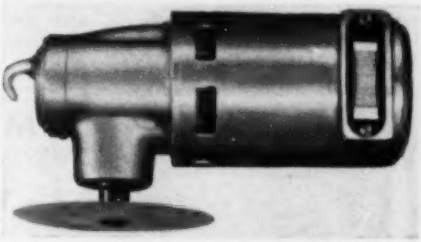


Hanna "Flo-Set" Speed Control Valve

to 250 p.s.i. and maximum temperature of 250 deg. F. has been announced by Hanna Eng. Works, 1765 Elston Ave., Chicago 22, Ill. Designed for mounting in any position, the valve is available in three sizes of ¼, ⅜, and ½ inch featuring micrometer graduations for the precision speed control of low pressure cylinders. The valve is also available in a ¼-inch Jr. size which is specifically designed for use with tubing and functions the same as the larger sizes but does not include micrometer adjustments.

Disc Grinder Applicable to Various Operations

Designated as the "Discette," an improved lightweight disc grinder for precision grinding, shaping, and polishing operations is now being offered by Craft-Hollow Industries, Wallingford, Pa. The grinder is driven by a 12,000 r.p.m. motor and weighs 4½ lb. Three types of abrasive discs are available for the grinder,



Craft-Hollow "Discette" Lightweight Disc Grinder

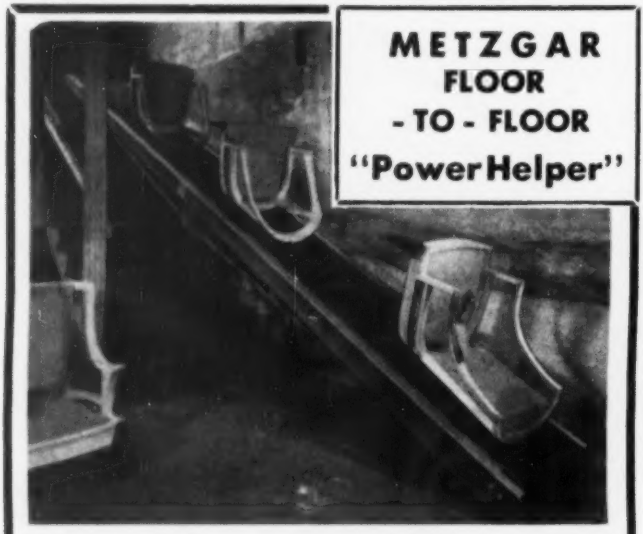
thus allowing a wide variety of metal finishing operations to be performed. The grinder is supplied with seven discs.



Bur Resharpening and Salvaging Service Aids in Tugsten and Cobalt Conservation

Pratt & Whitney, Division Niles-Bement-Pond Co., West Hartford 1, Conn., has announced a bur resharpening service which is available not only to users of P & W Kellerflex carbide and high speed steel burs but also to users of competitive manufacture. It is claimed that plants taking advantage of this service not only aid in the tungsten and cobalt conservation program but will also find that substantial savings can be realized by salvaging their worn burs.

Burs returned for resharpening are first inspected for shank runout. Bent shanks are removed and either straightened or replaced. The resharpening process is performed in the same manner that new P & W Kellerflex burs are ground, with a bare minimum of stock being removed to ensure longest possible bur life. Special machines are used which are designed to grind precisely under the control of extremely accurate master forms. This process is said to ensure complete shank concentricity plus uniformity of flute spacing and angles. The result is a sharp, cleanly fluted tool with cutting ability which is claimed to be equal to that of a new bur.



METZGAR FLOOR - TO - FLOOR "PowerHelper"

More Efficient than an Elevator —

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for Suggestion. Give height, floor to floor and horizontal space available — Also maximum unit load.

Cost $3,044 LESS!

- Saves on Maintenance.
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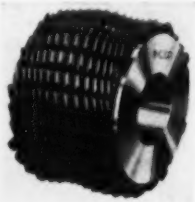
METZGAR CO.

466 Douglas St., N. W.

GRAND RAPIDS 4, MICH.

Elliptical Gear Hob

A special form hob for producing elliptical gears on a standard hobbing



Barber-Colman Elliptical Gear Hob

machine has been announced by Barber Colman Co., 8539 Loomis St., Rockford, Ill. The hob has a number of leads equal to one-half the number of teeth in the gear, each lead cutting two diametrically opposite teeth. Since the teeth are designed from a base ellipse rather than a base circle, even the involute curves on opposite sides of the same tooth are not similar. Thus, each thread on the hob differs from each other thread.

T-Slot Cutter Features Maximum Side Chip Clearance

A T-slot cutter with straight shank for use in Reltool and other standard holders has been placed on the market



Reltool Straight Shank T-Slot Cutter

by Reltool Corp., 4540 W. Burnham St., Milwaukee 14, Wis. Available in a full range of standard sizes, the cutter features maximum side chip clearance which is said to result in a free-cutting action and minimum tool breakage. The staggered cutter teeth are undercut and are claimed to conform to the standard dimensions adopted by the Simplified Practice Committee. The cutter can also be obtained with a taper shank if desired.

Micrometer Has Carbide Measuring Faces

An outside micrometer caliper now being offered by Brown & Sharpe Mfg. Co., Providence 1, R. I., is available in a wide variety of models and features carbide measuring faces; large diameter thimble with wide spaced divisions for easy reading; one-piece stainless steel spindle and screw, permanently rustproof; hardened and ground threads; dull chrome finish; black figures and graduations; sliding taper thread adjustment; positively lock-



Brown & Sharpe Micrometer Caliper

ed screw and thimble; quick and easy thimble adjustment; and other improvements.

42

STOCK SIZES

IN

HALLOWELL

SOLID STEEL

COLLARS

Precision machined for shafts from 1/16" to 3" diameter inclusive.

Write for prices and name of your nearest distributor.

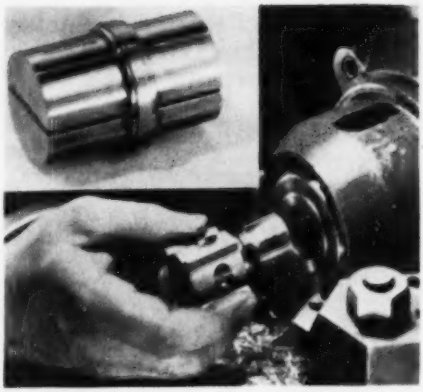
SPS

STANDARD PRESSED STEEL CO.

JENKINTOWN 22, PENNSYLVANIA

Expanding Arbor

Known as the "Auto-Arb," an expanding arbor designed for holding workpieces by the inside diameter while machining, counterboring, chamfering, or finishing the outside surface is now being marketed by The Asco Corp., 17718 Waterloo Rd., Cleveland 19, Ohio. The arbor is said to permit chucking and unchucking the work without stopping the spindle. Constructed of alloy steel hardened to a Rockwell C 45-50 reading, the arbor is said to expand accurately and is ideally suited for working in "blind" holes.



Asco "Auto-Arb" Expanding Arbor in use

The Auto-Arb is available in two types. The Type A has a capacity for holding work with inside diameters ranging from $\frac{3}{8}$ to $1\frac{1}{2}$ inches on five sizes of collets. The Type B is designed to accommodate work with inside diameters from $\frac{11}{16}$ to 1 inch on a machine with $\frac{1}{2}$-inch collet, and from $1\frac{1}{4}$ to $1\frac{1}{2}$ inches with a 1-inch collet.

Countersinking Tool

A portable air-powered countersinking tool which is said to supply its own thrusting action and which contains a self-locking grip that holds the tool firmly to the work sheet while operating is now being manufactured by the Buckeye Tools Corp., Division 17, 29 W. Apple St., Dayton 1, Ohio. Designed for countersinking holes $\frac{3}{8}$ inch in diameter and larger, the tool is available in capacities ranging from $\frac{3}{4}$ to $1\frac{1}{8}$ inches across the mouth.

Almost completely automatic in opera-

ALL in ONE TOOLHEAD



BORING
FACING
TURNING
GROOVING
UNDER-CUTTING

SIX SIZES AVAILABLE

All Have Power Feed for Facing

Write today for complete details.



CHANDLER TOOL CO.
Muncie, Indiana

Model "D"

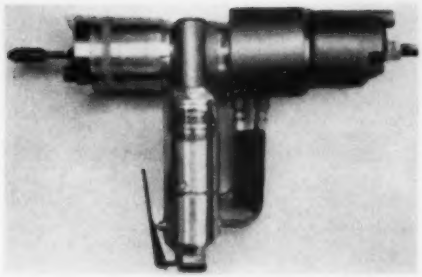
COMBINED BORING & FACING TOOL HEADS
Chandler-Duplex

DIAMOND WHEELS



Write for catalog and name of distributor nearest you

Manufactured by
UNITED STATES DIAMOND WHEEL CO. AURORA ILLINOIS



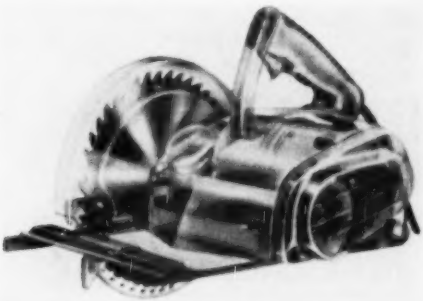
Buckeye Countersinking Tool

tion, the tool requires no manual effort other than inserting a mandrel in the hole to be countersunk. The expansion of the mandrel locks the tool in operating position. Drilling speed and depth of cut are predetermined and automatically controlled. When the countersinking operation is completed, the mandrel contracts, permitting the removal of the tool from the hole.

Portable Electric Saw

A portable electric saw which can be equipped with blades for cutting light metals such as light gauge flat or corrugated sheet iron and also sheet or tube copper, brass, bronze, and aluminum is now being marketed by the Syntron Co., 309 Lexington Ave., Homer City, Pa. The saw is equipped with a 1½-h.p. motor and an 8½-inch blade driven through dual V-belts. Constructed of tough metal stampings, the saw utilizes an adjustable base for making bevel cuts ranging from 90 to 45 degrees. The base is also adjustable for depth of cutting ranging from 0 to 2⅛ inches.

Syntron Portable Electric Saw



BRADFORD TOOLS

• DO A BETTER JOB

• ARE A BETTER BUY

More and more shops are finding that Bradford Electric Tools do *better* work, and stay on the job *longer*. That's because Bradford Tools are designed and constructed to meet today's work requirements with labor-saving efficiency.

NEW BRADFORD 6" AERIAL GRINDER



For easy, accurate grinding, wire brushing or polishing all classes of work—from ornamental iron to heavy "I" beams. Tool has excellent balance. Powerful motor develops 1 hp.; has no-load speed of 4000 r.p.m. Ball bearing construction. Equipped with one 6" x 1" x⅝" hole general purpose wheel. Length, 25"; weight, 17 lbs.



BRADFORD "Metalmaster" MODEL 49 ½" DRILL

Fine balance, light weight and streamlined design make the "Metalmaster" Model 49 the most popular ½" drill. Drills ½" in steel; 1" in hardwood. Powerful 110 volt universal motor. Armature, spindle and gear shafts supported by ball bearings with sealed-in lubrication. Jacobs chuck. Net weight only 10¼ lbs.

• • •

ASK your tool supplier to demonstrate these precision Bradford Tools. Write for full information on the complete line of Bradford Portable Drills, Saws, Sanders, Polishers; Bench and Pedestal Grinders, Buffers.

THE BRADFORD MACHINE TOOL CO.

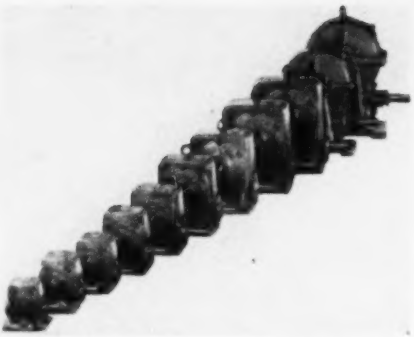
658 Evans St. **Cincinnati, Ohio**

Precision Since 1840

Heavy Duty Reductors Have 0.45 to 588.23 R.P.M. Output Speeds

Boston Gear Works, 68 Hayward St., Quincy 71, Mass., has announced the addition of improved heavy duty model reductors to its line of speed reducers. The complete range of T Series horizontal right-angle drive reductors illustrated herewith is representative of these heavy duty units which are equipped with heavy gears, worms integral with shafts, housings of iron, and rugged steel shafts.

An improved numbering system facilitates the selection of the correct reductor for any speed reduction requirement. Gear ratios range from 1 to 1 up to 4,000 to 1. Output speeds, based on full load motor speeds, range from 0.45 to 588.23 revolutions per minute.



Boston T Series Heavy Duty Reductors



DRILL THESE HOLES
BY A QUICK, EASY, INEXPENSIVE METHOD
Your business letterhead will bring literature.
WATTS BROS. TOOL WORKS
Wilmerding, Pa.

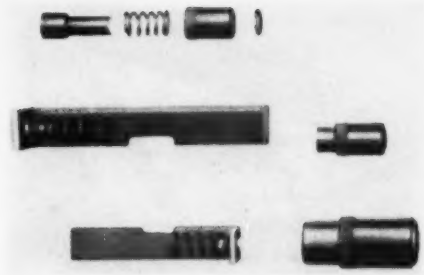
Die Stop-Pins and Finger-Stops

A line of die stop-pins and finger-stops is now being marketed under the trade name of "Supeream" by the Twentieth Century Mfg. Co., 3724 Montrose Ave., Chicago 18, Ill. The stop-pins are completely self-contained units which are fastened to the stripper plate by means of a drilled and reamed standard hole for any of the five available sizes. The pins are hardened and have $\frac{1}{16}$-inch walls to permit locating close to die openings and punches for the most economical use of stock.

The Supeream Finger-Stops are of uniform widths to fit standard slots and require only grinding on the ends for correct length. The stops are available in three sizes in push and pull types, the push type stops being intended for use wher-







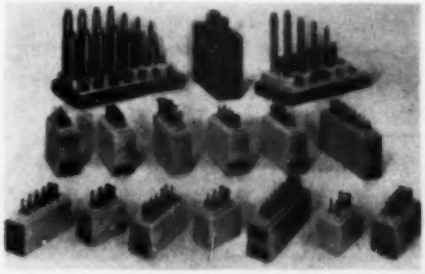
"Superream" Stop-Pins and Finger-Stops

ever diemakers desire stops for holding material against the back gage of a stripper.

Boring Tool Sets Facilitate Jig Boring Work

To facilitate the work of jig boring operators, Bokum Tool Co., 14775 Wildemere Ave., Detroit 21, Mich., has put up into sets various groupings of its boring tools. These sets, made up into sixteen different combinations of boring tools, are said to meet practically every requirement in any shop, not only with respect to diameters of holes, which may run as small as $\frac{1}{8}$ inch, but depths of holes as well. The larger diameter tools have separate cutters—all interchangeable to fit the shanks supplied. In some cases, two shanks for each tool size are included, a short stubby standard and an extra long. Some sets contain $\frac{3}{4}$ and 1-inch adapters to fit tools with $\frac{5}{8}$-inch shank diameters to provide a range of small boring diameters.

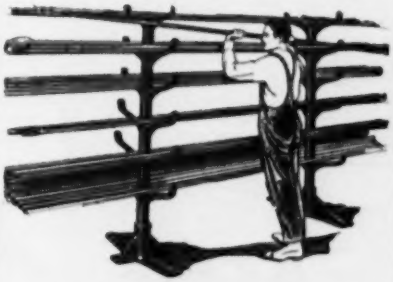
Sets containing combinations of tools not represented in the standard assortments can be obtained. Moreover, a specially designed resharpening fixture is available.



Bokum Boring Tool Sets

SPEEDS UP STOCK-ROOM SERVICE

The BROWN SECTIONAL RACK saves the time previously lost in end-hauling each bar of stock its entire length from the old-style, closed-side Rack, the Brown Rack requiring but a few inches of side movement. Each length, width and thickness of stock is displayed in gold-fish visibility for instant selection. Workmen waiting for stock are served without waste of time.



Any time you require additional storage space, all you need do is add more units. If you want to relocate it at any time, you can do so quickly for it is unattached to the building.

It is a simple, durable article made of metal in five styles. It can't burn, warp, sag or twist; depreciation is practically nil. SEND FOR BULLETIN No. 26-B DESCRIBING

BROWN'S *QUICK-SERVE* RACKS

BROWN ENGINEERING CO.

120 N. THIRD ST. READING, PA.

RACKS • VISES • CLUTCHES • COUPLINGS

Pressure-Sensitive Tape Makes Wear-Resistant Labels

Made of two layers of acetate with a white waxy substance sandwiched in between, a pressure-sensitive tape which, it is claimed, can be written on with a pencil, stylus, nail, or other blunt instrument to produce a water-proof, oil-proof, smudge-proof, and acid-resistant label has been announced by Labelon Tape Co., 100 Anderson Ave., Rochester 7, N. Y. Said to be ideal for labeling bar stock, shaftings, rods, punches, dies, special parts of all kinds, stock bins, jigs, fixtures, and other items subjected to considerable handling, the tape requires no moistening and is claimed to adhere to metal, wood, glass, plastics, ceramics, and other materials. Moreover, the tape, it is stated, can be transferred from one surface to another repeatedly without leaving a sticky residue or destroying the adhesive qualities of the tape.

According to the manufacturer, the tape will not discolor, curl up at the edges, or turn yellow with age. This feature, as well as the fact that the tape is weather-proof, is said to make it ideal for labeling material for outdoor storage. The tape is claimed to adhere and retain its legibility over a temperature range from minus 40 deg. F. to 150 deg. F. It is available in black, blue, red, or green colors in $\frac{5}{8}$, $\frac{3}{4}$, 1, and $1\frac{1}{2}$-inch widths in standard rolls 400 inches long and in industrial rolls 800 inches long. Standard rolls up to 1 inch wide are packaged in a self-dispenser box with built-in cutting edge. Industrial rolls are mounted on a 3-inch core and are said to fit any of the heavy duty tape dispensers.



Labelon Tape

USE
ACME
RED OR BLUE LABEL
PRECISION
DOWEL
PINS
WRITE FOR CIRCULAR

SAFEGUARD
EXPENSIVE DIES AND MACHINE PARTS

Acme Dowel Pins break before bending or mushrooming—thus saving expensive equipment from ruin through misalignment. Order standard sizes from stock. Attractive prices on special sizes and large quantities.

Acme Industrial Company
Makers of Standardized Jig & Fixture Bushings
212 N. Laflin Street • Chicago 7, Illinois

THE SERVICE SHOP TO INDUSTRY FOR MORE THAN 25 YEARS

Revolving Stamp Holder

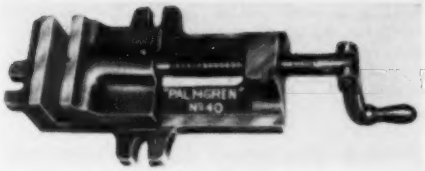
The Acromark Co., 9 Morrell St., Elizabeth 4, N. J., has developed a revolving stamp holder, the purpose of which is to make individual steel letter and figure stamps more readily available for use of the tool and diemaker on his workbench. Designed to hold a full set of letter stamps, a full set of figure stamps, and several extra character stamps such as period, comma, dash, and diagonal line, as well as special characters, symbols, or fractions needed for special markings, the holder consists of a cast iron base from the center of which the revolving holder section rotates on a pin at the slightest twirl by the user. The unit holds the individual stamps at an angle so that the stamp needed extends toward the user. Below each stamp on the face of the holder is a large easy-to-read number, letter, or character indicative of the stamp it designates.



Acromark Revolving Stamp Holder

Drill Press Vise

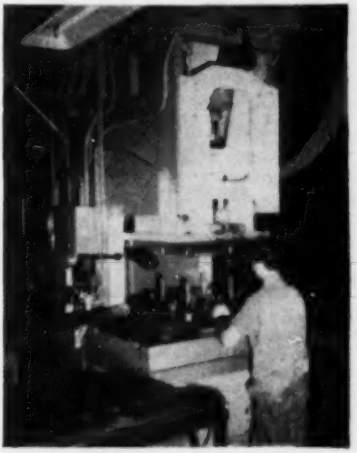
Designated as the "Palmgren" No. 40, a compact drill press vise for shop operations has been announced by Chicago Tool & Engr. Co., 8309 S. Chicago Ave., Chicago 17, Ill. The vise has 3½-inch wide jaws which can be opened a depth of 1⅝ inches. The movable jaw is grooved vertically for holding round work.



"Palmgren" No. 40 Drill Press Vise

The vise is 2½ inches high overall and has a heavy steel adjusting screw with coarse pitch Acme thread for fast action

THIS
Verson
OPEN BACK GAP PRESS blanks 30 adding machine side frames per minute!



With this 150 ton Verson Open Back Gap Press, the Victor Adding Machine Company, Chicago, is able to combine high production with extreme versatility. In addition to blanking 30 side frames per minute, the same press is also used for blanking and forming base panels and blanking, forming and piercing keyboard panels at high rates.

This press is part of the Verson line of open back gap presses that includes upright, inclinable and permanently inclined models with normal operating capacities of 90, 125, 150 and 180 tons.

We will be happy to send you further information on efficient, versatile Verson Open Back Gap Presses. Write for descriptive literature.

VERSON ALLSTEEL PRESS CO.

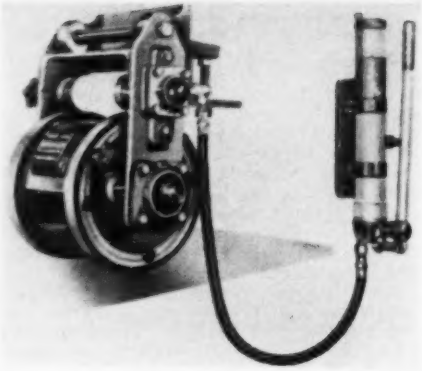
9310 South Kenwood Avenue
CHICAGO 19, ILLINOIS

Holmes St. and Ledbetter Drive
DALLAS 8, TEXAS

and a swivel crank handle for ease in turning when the vise is mounted on a machine table. Three bolt lugs are provided on the vise base for mounting purposes.

Device Designed for Continuous Marking of Sheet or Coiled Stock

Developed by Jas. H. Matthews & Co., 3944 Forbes St., Pittsburgh 13, Pa., for the automatic imprinting of trade marks, heat numbers, and inspector's identification mark on each sheet or coil as it emerges from temper mills or shear lines, the Matthews No. 216 Coil and Sheet Printer illustrated herewith is fundamentally a revolving cylinder to which a rubber printing die is fastened. As the cylinder is revolved by the rubber drive tires in contact with the steel passing beneath, a clean, legible, inked impression is said to be produced. According to the manufacturer, the unit is suitable for permanent or water soluble marking on all types of steel run or temper mills, hot or cold reducing mills, or continuous galvanizing lines, and can be used for marking on a flat surface or mounted directly on top of the coil at the reel.



Matthews No. 216 Coil and Sheet Printer

Also useful for the continuous marking of aluminum, brass, and any strip or board material, the device features an internal feed inking unit which is said to eliminate the need for brushing ink on the ink roll and ensure control of ink distribution. The device also features a positive quick-acting mechanism which is said to firmly lock the printing plate into position and eliminate the possibility of its flying off at any mill speed.

Cut Boring Costs

Boring
C'Boring
Fly Tooling
Facing



Blind Hole Bottoming

Many enthusiastic users report that the Behr Boring Bar actually pays for itself in the first four weeks of operation. Just ask the man who uses one.

This proven, patented bar is chatter proof, extremely accurate and ultra efficient. Has interchangeable blades and accessories.

It is unequalled for versatility and efficiency.

BEPCO

Can you afford not to get the facts?

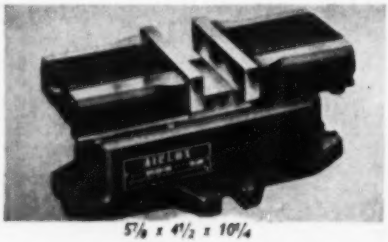
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BEHR PRODUCTS COMPANY
WARREN, MICHIGAN

AIRLOX
PNEUMATIC VISES

- small vise —
- fast SURE grip!

Jaw force 25 x airline pres. Fast SURE grip engineered into small package...for bench & machine operations. *Ask for data sheet "J"*

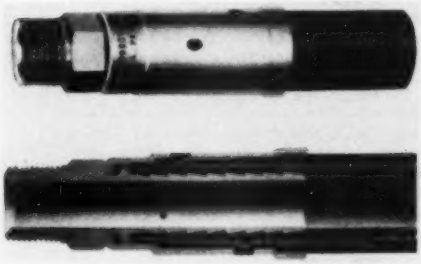


5⅛ x 4½ x 10¼

production devices, inc. Whitehall, New York

Hydraulic Hose Coupling of Pressed-On Design

Through employment of a unique hose-to-coupling anchoring principle, the "Press-Lock" Hydraulic Hose Coupling



"Press-Lock" Hydraulic Hose Couplings

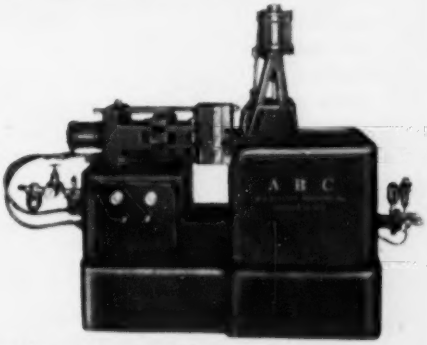
developed by Mulconroy Co., 5326 Jefferson St., Philadelphia 31, Pa., is said to assure maximum strength, safety, and efficiency in service. The coupling consists of a corrugated stem with wide hexagon section, male iron pipe thread (or special thread), and collar to engage a sleeve which extends the full length of the stem corrugations, with the forward end of the sleeve shaped inward to engage the stem collar and the opposite end flared to assist flexing of the hose. A locking ring is provided between the stem collar and anchoring flange of the sleeve.

In attaching the coupling, considerable pressure is applied to the above assembly, thereby uniting the sleeve, ring, and stem into a solid unit through displacement of the hose wall. In this displacement process, the mass of rubber comprising the hose is forced in two directions: (1) inward around the corrugations on the stem and (2) outward through apertures in the sleeve. This outward displacement of the rubber involves the internal layer (or layers) of reinforcing wire, causing it to move toward the openings in the sleeve and to protrude beyond the normal diameter of the wire braid at these points, thus effecting a locking arrangement. Engagement of the forward end of the sleeve over the collar located directly behind the hexagon section of the stem is said to complete the powerful blowoff-proof grip of the coupling on the hose.

The coupling is made of steel in sizes to fit hose from $\frac{1}{4}$ to 2 inches i.d. and is available in connection with Mulconroy hydraulic hose assemblies or attached at the factory to the user's own hose.

The A. B. C. in diecasting
For Low Cost Production

1 LB. ZINC CASTINGS
8 x 10 DIE BLOCKS.
AUTOMATIC CYCLING.
ADJUSTABLE TIME DWELL.
225 LB. POT.
AIR OPERATED.
1000 FREE CYCLES PER HOUR.



Write for circular.

Several territories open for representation.

A. B. C. DIECASTING MACHINE CO.
339 W. 112TH PLACE • CHICAGO 28, ILLINOIS

Liquid Soap Reduces Industrial Dermatitis

An antiseptic soap that is said to aid in the reduction of industrial dermatitis is now available from Davies-Young Soap Co., Dayton, Ohio. Designated as "Dysept," the liquid soap is claimed to reduce infections of bacterial origin by killing and inhibiting the growth of the majority of surface skin bacteria through the use of a compound known as hexachlorophene. This ingredient, it is stated, is not volatile, does not have a disagreeable odor, is non-toxic with normal usage, and does not stain, irritate, or sensitize the skin.

While having an immediate degerming effect, Dysept is claimed to increase its antibacterial power with regular use. Said to retain its bacteria killing power when diluted with water, the soap is available in 55, 30, 15, and 5-gallon containers and can be used with any liquid soap dispenser.

Dial Indicator Features Twin Contacts

A dial indicator with enclosed end to prevent dirt and chips from entering into the mechanism and causing the pointer to stick has been placed on the market by Superior Indicator Co., P. O. Box 734, Rochester 3, N. Y. Chrome-plated and rust-proof, the indicator has a double face which permits it to be read from either the front or back.

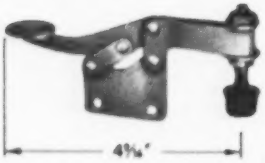


Superior Double-Faced Dial Indicator

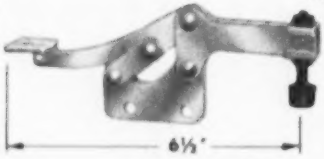
Outstanding features of the indicator include its twin contacts. The $\frac{1}{32}$-inch hardened contact is threaded and telescoped inside the larger $\frac{1}{8}$-inch contact. If work requires a fine point, the $\frac{1}{8}$-

Where jobs require

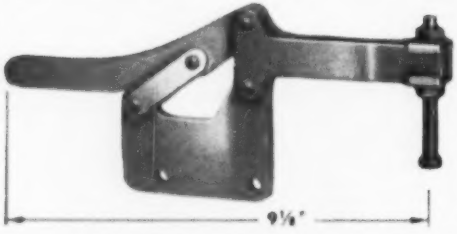
ANGLE CLAMPING



This side mount clamp is ideal to use where the toggle bar must be positioned at an angle. The clamp can be easily rotated to meet such requirements much better than one with tee base, which necessitates blocks or shims to achieve the desired angular mount. Three sizes are available.



SEND FOR NEW BULLETIN



Other clamps we make include vertical and horizontal types with various mounts, cam-action and air-operated clamps, "C" clamps, pliers, and wrenches. Ask for new, complete catalog.

Model HS-200 4¹⁵⁄₁₆" long, recommended pressure 200 lbs.
Model HS-400 6½" long, recommended pressure 400 lbs.
Model HS-600 9⅛" long, recommended pressure 600 lbs.

KNU-VISE PRODUCTS **LAPEER MFG. CO.**
3048 DAVISON ROAD • LAPEER, MICHIGAN

Western Division, 422 Magnolia St., Glendale, Calif.

inch contact can be removed by unscrewing, leaving the $\frac{1}{32}$-inch contact ready for use. If the work to be tested requires a more sturdy contact, the $\frac{1}{8}$-inch tip is simply screwed over the $\frac{1}{32}$-inch contact. Also available are $\frac{1}{16}$-inch long extensions, as well as non-magnetic tips.

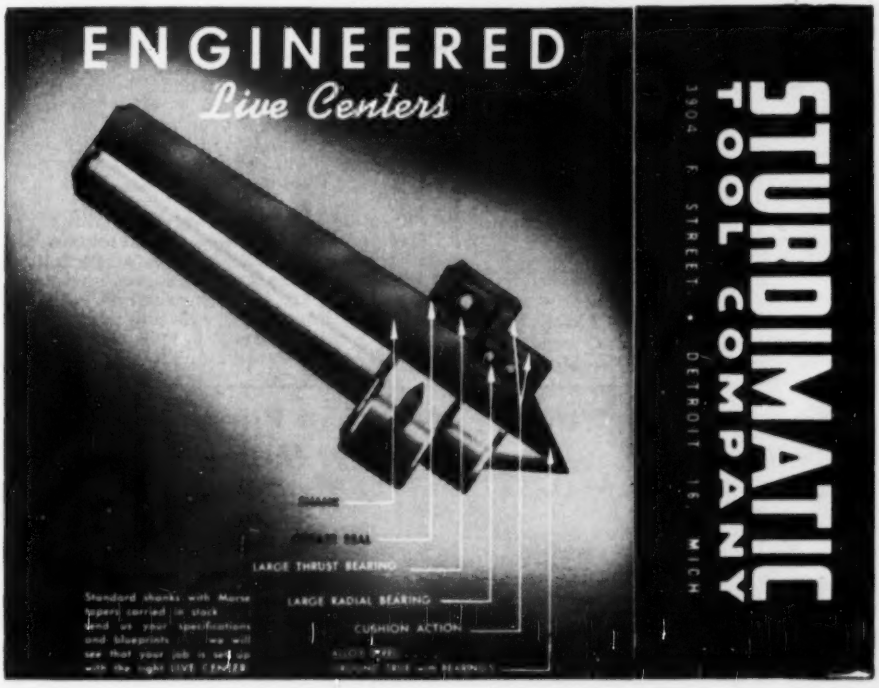
Electric Hand Shear

Known as the "Flex", an electric hand shear available in four models for cutting various thicknesses of sheet metal is now being offered by R. Caluwaerts Co., Inc., 1 W. 67th St., New York 23, N. Y. Of extremely sturdy and wear-resistant construction, the shear, it is claimed, has a high cutting capacity and will withstand severe use in continuous operation. According to the manufacturer, the design of the tool is such that maximum visibility is always assured, thus making accurate cutting along straight lines an easy operation. The long handle is said to provide for safe and comfortable operation.

The Flex Electric Hand Shear includes a universal motor for operation on a.c. or d.c. of the same voltage, and is equipped with ball bearings. The construction also includes a metal housing with built-in tumbler switch and attached cutting arrangement. The tool is furnished with three pairs of special cutters, a three-meter cord with plug, and two spare carbon brushes. It can also be furnished as a stationary power shear for jobs where sheet metal is to be cut into long strips or small pieces are cut to shape.

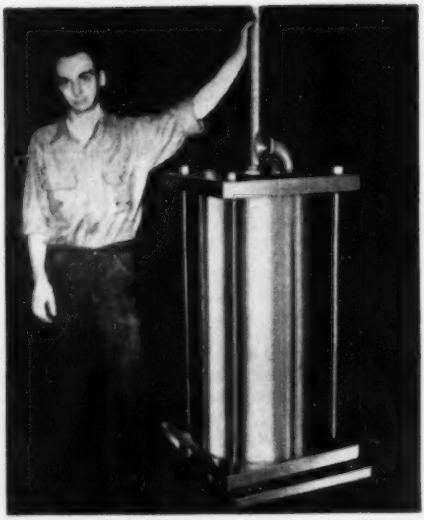


"Flex" Electric Hand Shear in use



Large Diameter Cylinders Capable of 15, 30, and 195 Tons of Lifting Power

Large diameter cylinders of 15, 30, and 195 tons lifting power are now being offered by Miller Motor Co., Dept. M, 4027 N. Kedzie Ave., Chicago 18, Ill. The 20-inch diameter model air cylinder is said to produce over 30 tons of lifting power at rated operating pressure of 200 p.s.i. This is a counterbalance type of air cylinder which is particularly adaptable for use on presses and other heavy production machinery and is also available in 18, 16, 14, 12, 10, and 8-inch bores.



Miller Large Diameter Cylinder

At its rated 2,500 p.s.i. operation under shock load conditions, the 12-inch bore model high pressure hydraulic cylinder is claimed to produce over 140 tons of thrust and, in non-shock load conditions, over 195 tons of thrust at 3,500 p.s.i. operation. Cylinders of this type are available in sizes down to 1½-inch bores.

The large diameter cylinders have non-breakable solid steel heads, caps, and mountings; scratch resistant hard chrome plated piston rods; piston rod dirt wipers; precision-honed barrels of 15 micro-inch finish; and self-regulating, wear compensating, leakproof and tamperproof seals. The standard air and the counterbalance type air cylinders have non-corrosive brass barrels to prevent rust from air moisture. The cylinders are

WANTED Most FOR HIGH ACCURACY STAMPING OPERATIONS

V&O LONG SLIDE Precision POWER PRESSES

Available in sizes from 3 to 185-ton capacity.

THE V&O PRESS COMPANY
DIVISION OF HARTFORD-EMPIRE COMPANY
Builders of Precision POWER PRESSES and FEEDS
Since 1889 HUDSON, N.Y.

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MELCO CENTER POINT
LUBRICANTS...

ideal for wherever extreme pressure or frictional heat prevails . . . on lathe, milling or grinding centers, steady rests and journals . . . tapping, broaching and extruding. Also excellent additive for cutting, broaching, tapping or drawing oils.
Sold in tubes, quarts, gallons or drums in oil or grease form.

Send for Free Sample

C. B. TEETER
4470 Oakenwald Ave., Chicago 15, Ill.



Put the "PUNCH" in Punch Presses with a MODERN Motor Drive

No need to use slow speed or geared motors and small pulleys to slow down your presses.
Utilize standard 1750 RPM motors.
"V" Belt Drive absorbs shock. Operate smoothly, silently, efficiently, economically. *Write to Dept. MS for complete details.*

MODERN MOTOR DRIVES DIV. of The Nichols Engr. Co.
Dept. MS, 3816 W. GRAND AVE. CHICAGO 51, ILL.

offered in a wide variety of convenient mounting styles and, with the exception of the counter-balance type air cylinders, are also available in double rod end styles.

Burnishing Machine Said to Polish 600 or More Pivots Per Hour

Hauser Machine Tool Corp., 30 Park Ave., Manhasset, N. Y., is now offering a high precision Swiss burnishing machine for polishing pivots from 0.008 to 0.197 inch in diameter and from 0.315 to 5 inches in length. Designated



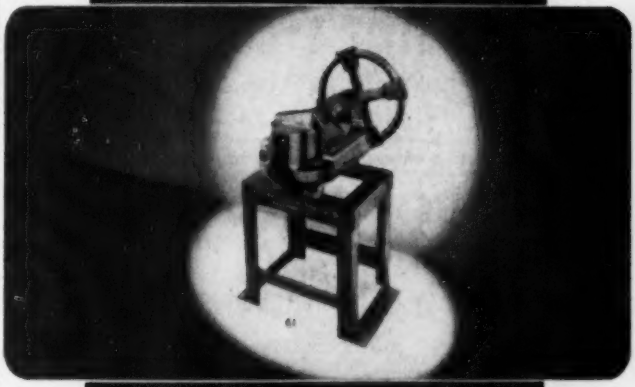
Hauser Type 241 Pivot Burnishing Machine

as the Type 241, the machine can be operated by unskilled workers and is said to polish pivots of straight design or with taper or radius. Constructed to accommodate work in collets or on centers, the unit is claimed to be capable of polishing mild steel, hardened steel, stainless steel, brass, nickel, bronze, and other pivots at a rate of 600 or more per hour. It can be furnished with or without a stand.

Air-Operated Vise with Interchangeable Jaw Faces

The Van Products Co., 2151 Baldwin Bldg., Erie, Pa., has added an air-operated vise with interchangeable jaw faces to its line of "Vi-Speed" air-operated vises. The unit is available in standard and standard long stroke models, designated as the No. 457R and 457R-6 respectively. The faces of the vise are made of hardened tool steel with either serrated or smooth surfaces. The faces can be firmly attached to the jaw castings by means of spring tempered

WHITNEY METAL
TOOL COMPANY
41 YEARS EXPERIENCE

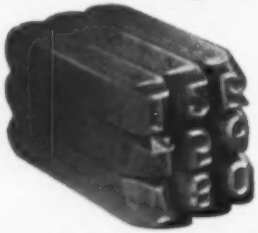


WHITNEY-JENSEN
No. 61
ANGLE IRON BENDER

An extremely useful tool, especially where quantities of larger angle iron is formed. Capacity 3" x 3" x ⅛", all sizes of angle iron and flat bars. This bender can be bench or floor mounted. Four 18" operating bar handles are furnished.

WHITNEY METAL TOOL COMPANY
110 FORBES STREET, ROCKFORD, ILLINOIS

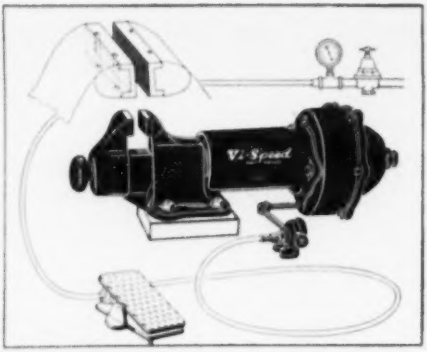
Why THOR STAMPS Last Longer



. . . because they're made of a special, correctly-heated alloy steel. Central striking point assures uniform marking. Thumb side marking assures easy use.

You get more mark per dollar with THOR STAMPS. Write for catalog and prices.

The Pittsburgh Stamp Co., Inc.
812 CANAL ST. • PITTSBURGH, PA.



"Vi-Speed" Model 457R Air-Operated Vise with interchangeable jaw faces

pins driven into holes drilled so as to bind both faces and pins, and can be easily and quickly removed by driving the pins out with a punch.

The vise is supplied with a foot pedal, pressure regulator, pressure gage, coupled hose, handle for manual operation, quick release valve (with the Model 457R), and relay valve (with the Model 457R-6).

USE ECONOMY

Headless Set Screws

Socket Set Screws



Try Them On Your Next Job!

ECONOMY MACHINE PRODUCTS COMPANY
5212 Lawrence Ave., Chicago 30, Ill.

Improved Speed Reducer Employs Double-Enveloping Gearing

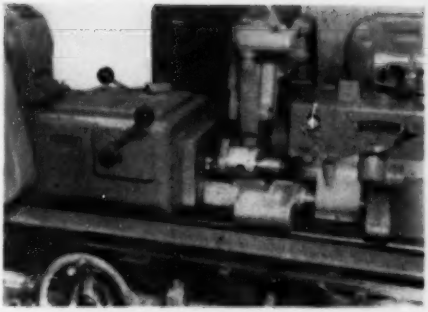
An improved standard duty speed reducer employing double-enveloping gearing has been announced by Cone-

Cone-Drive Improved Standard Duty Speed Reducers



Drive Gears, Div. of Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich. All operating parts of the improved unit are directly interchangeable with former models.

Shown left to right in the accompanying illustration are reducers of 2, 2½, and 3-inch center distance which are available in standard ratios of 5:1 to 50:1 (60:1 on the 3-inch). Horsepower ratings for these compact reducers range as high as 9.04 h.p. at 1750 revolutions per minute.



Norton "Cam-O-Unit in use

Unit Permits Grinding Automotive Pistons to Taper

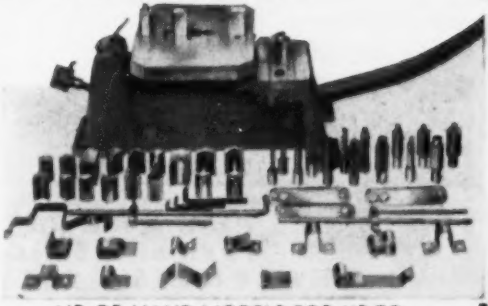
A unit for grinding automotive or other types of pistons where a taper to the conventional relief form is required has been announced by Norton Co., Worcester, Mass. The "Cam-O-Unit," as it is known, permits the desired shape to be ground by holding the piston between centers, with the head end of the piston being carried in a dog or holder and centered on the master cam spindle center. The bottom end of the piston is supported on a special footstock center carrying a spherical ball bearing that serves as a pivot about which the piston revolves and oscillates according to the motion of the rocking bar as imparted by the master cam. In-and-out motion at the footstock pivot is zero, since this is a stationary point. Therefore, the motion and corresponding amount of piston relief that is ground at any point between these centers are proportional to the distance from the footstock pivot. Thus, a greater amount of relief is ground at the head of the piston than at the bottom of its skirt, which is nearer the pivot.

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Bends — Cuts — Punches — Flats — Rounds Into Any Shape — Clamps — Brackets — Springs — Busbars — Wire Forms — Aircraft Work — Steel Rule Dies, Etc.



AIR OR HAND MODELS FOR UP TO ¼" x 4" MATERIAL.

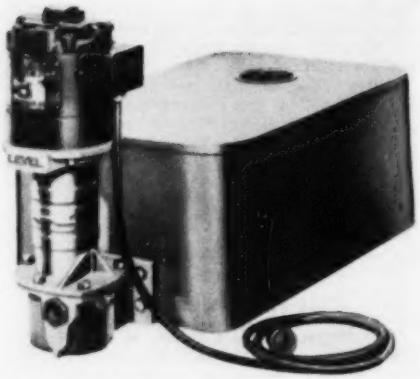
J. A. RICHARDS CO.

DEPT. 6M KALAMAZOO, MICHIGAN

Coolant Equipment Adaptable to Most Wet Machine Tools

Product of Delta Power Tool Div., Rockwell Mfg. Co., 602N E. Vienna Ave., Milwaukee 1, Wis., the Delta-Milwaukee Coolant Pump and Tank shown herewith are said to be readily adaptable to most wet machine tools. A single unit is claimed to meet the needs of a drill press with up to eight spindles.

The pump is of the centrifugal type and is attached directly to the tank by a flat machined flange. A six-bladed impeller is connected directly to the motor shaft. Several pump models are available with



Delta-Milwaukee Coolant Pump and Tank

capacities from 5 to 32 g.p.m. The ¼ h.p. motor is fully enclosed to protect it from moisture and caustic solutions and is mounted directly on the pump shaft. Motors of various electrical characteristics are available.

The tank is of 16-gallon capacity and includes a settling basin and wire mesh screen to keep coolant free of chips. In addition to the pump, motor, and tank, the coolant equipment includes a nozzle, valve, column mounting clamps, and flexible hose assembly for providing coolant feed and connection to piping.

Toggle Clamp Said to Deliver Holding Pressures up to 4,000 Lb.

Identified as the "De-Sta-Co" No. 650, a heavy duty plunger type toggle clamp announced by Detroit Stamping Co., 349 Midland Ave., Detroit 3, Mich., is designed to position and hold work firmly in place with a toggle locking action that



CAMS

A **complete** cam cutting service for both large and small cams is offered by our **ROWBOTTOM** and **DALY** cam milling facilities.

May we quote **YOU?**

BLAIR TOOL AND MACHINE CORP.
119-03 15th Ave. College Point, L. I., N. Y.

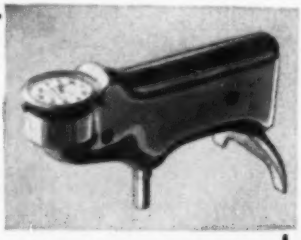
Use the BARBER COLMAN

"IMPRESSOR" for Fast and Efficient HARDNESS TESTING

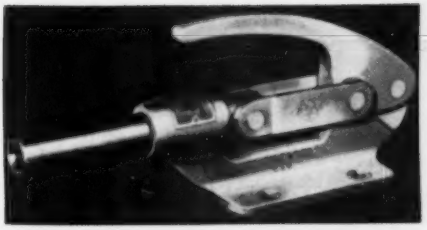
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and PLASTICS

Tiny surface penetration by spring-loaded steel point gives dependable measure of hardness. Direct dial reading. Place on surface and press. Can be used in any position, even on ends or edges of stacked pieces. Ideal for women inspectors. Thousands in use. Write for Bulletin F-1689-1.

BARBER-COLMAN COMPANY, 1238 Rock St., Rockford, Ill.



Price $55.00 Net, F.O.B. Rockford, Ill.
In fitted wood case with instructions



"De-Sta-Co" 650 Toggle Clamp

is said to provide holding pressures up to 4,000 lb. The base and plunger housing is a one-piece high-alloy heat treated steel casting, as is the handle; both castings are black crackle finish for rust resistance and non-slip grip. The plunger has a travel of 3 inches, with the end tapped for ⅝-inch diameter adjustment bolt. A self-lubricator pad on top of the plunger housing is said to assure proper lubrication of the plunger.

The clamp measures 3 inches wide x 4½ inches high x 11¼ inches long overall and weighs 5 lb. 10 ounces.

Holder Designed to Mark Outer Circumference of Small Parts

Identified as the Model PPH-10, a periphery press holder for marking the outer circumference of small diameter parts has been developed by M. E. Cunningham Co., 158 E. Carson St., Pittsburgh 19, Pa. The holder is custom made for each job, with the radius, size, and number of characters determined by the piece to be stamped.

Available with a shank of suitable size to fit practically any press, the holder is

Cunningham Model PPH-10 Periphery Press Holder



For DEBURRING
Faster . . .
More Efficiently . . .
More Economically!

Be Sure to Investigate the SPEEDIE Way!

THE KEYNOTE of today's defense program is *efficiency!* For an efficient deburring operation—whether on aluminum, brass or steel—you must have the *right compound* to remove burrs and heat scale as quickly and economically as possible!

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BP *Polishing Room Supplies and Equipment*
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Variable Ratio Pantographs, Pantograph Controlled, Profiling Vertical Millers.

For Contour Milling, Profiling, Intricate Cams, Calibrating, Die and Mold making. Engraves on curved surfaces without special templates, with smooth lines in any design, number, letter; on iron, brass, copper, aluminum, soft steels and all plastics • Drills a series of holes • Increases accuracy and production • Etches glass and similar items • For information and prices write Dept. M.

AUTO ENGRAVER CO.
Florida Hill Rd., Ridgefield, Conn.

GRANT **RIVETERS**



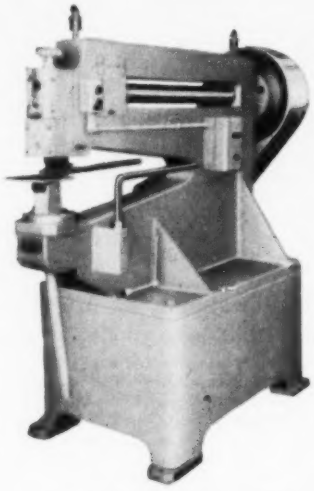
• Pioneers in the riveting field. Head rivets from smallest to ⅝" diameter, either by noiseless spinning or vibrating hammer method.—Sizes to meet all needs.—Types include Vertical and Horizontal Multiple Spindles. *Write for literature—and don't forget to send samples.*

THE GRANT MFG. & MACHINE CO.
96 Silliman Ave. Bridgeport 5, Conn.

designed to accommodate regular straight sided type, which is held firmly in place by a removable plastic side plate that is pliable and will compensate for slight variations in body type.

Nibbling Machine Cuts Odd Shapes of Ferrous and Non-Ferrous Metals

Campbell Machine Division, American Chain & Cable Co., Inc., 931 Connecticut Ave., Bridgeport 2, Conn., has announced



Campbell Nibbling Machine

a nibbling machine which is designed to cut odd shapes of ferrous and non-ferrous metals quickly, cleanly, and economically. With the machine, work can be fed equally well in any direction since it is cut with a rapidly moving circular punch which operates over a circular die. Pieces "nibbled" with the unit are said to require very little finishing work.

Provided with a two-speed drive and variable stroke, the machine is available in five models having throat depths from 24 to 36 inches for cutting low carbon steel and soft materials up to ½ inch and corrosion-resisting steel up to ⅜ inch.

File Kit

A clear blue plastic kit that slides open into two self-contained storage compartments each holding six assorted

files has been introduced by Grobet File Company of America, Inc., 421 Canal St., New York 13, N. Y. A feature of the kit



Grobet Plastic File Kit

is a plastic spring attachment which holds each file tang securely in place. The fine points are protected due to the design of the kit which is available with sets of 5½ and 6¼-inch overall needle files and escapement files in assorted cuts.

Wrench Designed for Heavy Duty Nut Setting Jobs

A ⅝-inch universal electric impact wrench designed for heavy duty nut setting jobs has been added to the Thor



Thor ⅝-Inch "Silver Line" Universal Electric Impact Wrench

NOW!

A SELF-ALIGNING, SELF-ADJUSTING LAP



Announcing

THE IDEAL "XPAND-O-LAP"

(Patented, No. 2,434,080)

FASTER — MORE ACCURATE REQUIRES NO ADJUSTMENT

No set screws — nothing to break — only 4 parts — arbor, two copper sleeves & S-shaped pressure spring.



Accurate because self-expanding pressure principle maintains concentricity and alignment, even when sleeves become worn. Faster because maximum area of shoe contacts work at all times. Specially tempered S-shaped spring applies constant, self-adjusting pressure against sleeves. Never galls or seizes. Worn sleeves can be replaced in a jiffy! Complete sets of 6 (in stand): one each 1/8", 3/16", 1/4", 5/16", 3/8" and 1/2".

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Please forward catalog information on "XPAND-O-LAP" and other items as checked:

☐ Live Centers ☐ Etchers ☐ Tachometers
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"Silver Line" by Independent Pneumatic Tool Co., Aurora, Ill. Operating at 2,000 r.p.m., the wrench is said to deliver 1,850 impact blows per minute both forward and reverse. Weighing slightly over 12 lb. and measuring 11⅝ inches long overall, the tool is equipped with a detachable dead handle for easy handling, has a ⅝-inch square spindle, and is claimed to drive machine screws up to ⅝ inch. Additional features include positive positioning of the reversing switch and a spindle bushing lock to withstand vibration of setting ⅝-inch nuts.

Transformer Welder

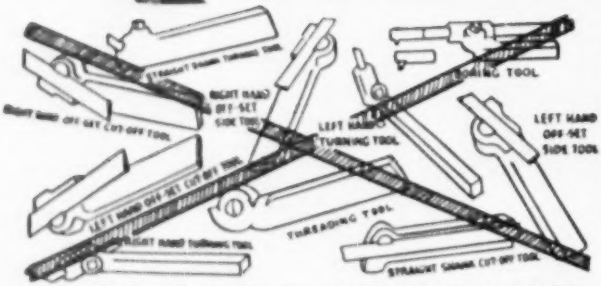
Air Reduction Sales Co., 60 E. 42nd St., New York 17, N. Y., has announced a 200-ampere transformer welder designed to cover a wide range of applications from light duty sheet metal jobs to heavy duty industrial work. Designated as the Airco Model MCX, this small, compact (12 x 17 x 23-inch high) arc welder has a full 200-ampere, 50 per cent duty cycle, N.E.M.A. rating. Three current ranges selected by insulated tapered plug connectors and infinite hand crank adjustments within each range provide currents from 30 to 200 amperes that permit the use of ⅛ to ⅛-inch diameter electrodes. The welder employs an automatic hot start control with hermetically sealed gas-filled time-delay relay magnetic switch that has no open contact.



Airco Model MCX Transformer Welder



ONE ALL-PURPOSE TOOL HOLDER INSTEAD OF TEN



ONE tool holder for all positions . . . No tool chatter . . . can do internal boring or internal threading . . . Ideal for carbide tools . . . Bit sizes: ¼", 5/16", ⅜", 7/16"

ACME TOOL COMPANY

73 WEST BROADWAY
NEW YORK 7, N. Y.

Chemical Liquid Is Claimed to Eliminate Fogging of Glasses

A chemical liquid which is claimed to eliminate fogging and steaming of goggles and eyewear of glass or plastic is now being marketed under the trade name of "K-Lens-M" Anti-Fogging Liquid by The Wilkins Co., Inc., Cortland 36, N. Y. Described as a surfactant-silicone composition designed to create an invisible coating on optical surfaces, the product is said to be non-hazardous in all respects, including shipment, application, and use.

To use K-Lens-M Anti-Fogging Liquid, the surface to be treated is cleaned, the liquid is applied from a spray type bottle, and the surface is polished with lint-free lens tissues. The coating produced, while completely effective in rendering the surface free of fog and steam for hours at a time under the most severe conditions, is invisible and does not impair vision in any way, it is stated. One application of the liquid is said to normally last for many hours, the time being dependent upon such factors as the smoothness and cleanliness of the lens itself before applying the liquid and the severity of exposure.



"K-Lens-M" Anti-Fogging Liquid

Coolant Clarifier Features Permanent Ring Magnets

Designed for individual application on machine tools such as wet surface grinders, thread grinders, milling machines, gear shapers, and so on, the Houdaille Magnetic Clarifier introduced by Honan-Crane Corp., 682 Wabash Ave., Lebanon, Ind., is said to remove over 98 per cent of contaminants from liquid coolants (mineral oils and soluble oil solutions used for grinding and cutting operations) and provide delivery of clean coolant to the machine sump for reuse. Removal of metallic and abrasive particles is accom-

MODERNIZE YOUR TURRET LATHES



WITH NEW "DONUT" DESIGN AIR CYLINDERS

PERMITS BAR STOCK TO PASS THROUGH CYLINDER

Get more production from your turret lathes on bar stock operations. Convert from hand-operated chucking devices to automatic chucking and release with Erickson's New Lever Type "Donut" Design Air Cylinder.

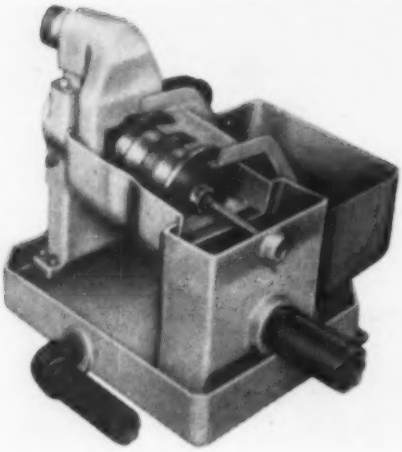
This single-acting cylinder can be set up for either push or pull mechanisms. When combined with an automatic bar feed, the Erickson "Donut" Design Air Cylinder provides for fully automatic handling of stock. All the operator does is touch the air control valve—the cylinder does the rest.

GET COST-CUTTING FACTS NOW!

Learn how the amazing new Erickson Air Cylinder can mean greater production efficiency for you.

ERICKSON TOOLS DIVISION

2303G HAMILTON AVE. • CLEVELAND 14, OHIO



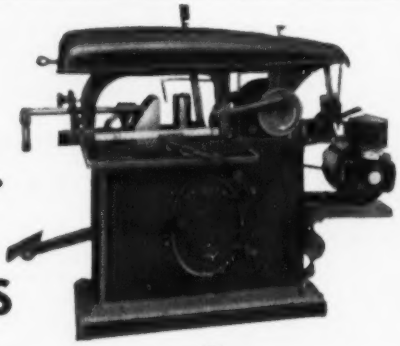
Houdaille Magnetic Clarifier

plished by the use of permanent ring magnets completely enclosed in a revolving non-magnetic cylinder. Circular steel discs (end pieces of the cylinder acting as magnetic poles) seal off the magnet cores to prevent fluid from coming in contact with the magnets. This design is claimed to provide for 360 degrees of constant magnetic attraction.

Turbulent flow of coolant beneath the cylinder keeps metallic particles in suspension until attracted to the metallic poles. Abrasive non-magnetic particles entrained with magnetized contaminants are collected by a non-magnetic wiper trough fitted to the magnetic cylinder. Wear is said to be eliminated on either surface since the trough does not rub on the cylinder; instead, the accumulation of magnetized particles is used to wipe the mass of contamination as the cylinder revolves past the trough.

The Houdaille Magnetic Clarifier is rated at 20 g.p.m. If the flow rate is increased beyond rated capacity, excess coolant automatically overflows into the base of the unit before reaching the magnetic field. While the rated flow of clean coolant is delivered, overage is returned to the sump of the machine tool, thus preventing spillage when the clarifier is operated above rated capacity. Completely automatic, the clarifier measures 22⅝ inches long x 6½ inches high x 15⅞ inches wide and has a net weight of 145 lb. It is designed for operation with a 1/12 h.p. 60-cycle 110-volt single-phase motor. A

HANDLE *MORE* CUTTING JOBS at LOWER COST . . . *with* KELLER POWER HACK SAWS





Cuts everything from heavy bars to thin wall tubing fast with KELLER Saws. Simple to operate . . . designed for long blade life . . . sturdy construction assures long operation with maximum maintenance. A low priced model for every requirement.

No. 3 Hy-Duty Model has patented adjustable blade pressure control.

WRITE TODAY For This New KELLER Hack Saw Catalog.

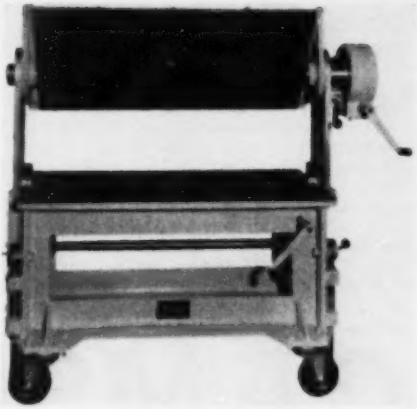
Sales Service Machine Tool Co.
2383 UNIVERSITY AVENUE
ST. PAUL 4, MINNESOTA

cycling pump on the machine tool or a separate pump and motor can be used to provide flow through the unit or, when possible to use gravity flow, a special interchangeable inlet casting is supplied.

Unit Handles Dies up to 24 x 33 Inches

A ruggedly constructed die handler which is said to provide for the safe handling and taking apart of heavy dies has been developed by Morley Machinery Corp., 1239 University Ave., Rochester 7, N. Y. The unit is designed to handle dies up to 24 inches wide x 43 inches long with shut height from 9 to 14 inches and weighing up to 1 ton. The upper platen has a 20 x 42-inch area and a vertical travel of 16½ inches. This platen is mounted on heavy hardened steel trunnions operating in anti-friction bearings and may be rotated 360 degrees by a hand cranking mechanism equipped with a locking pin which may be used at five angular positions of the platen.

The unit is mounted on four heavy casters which make it readily movable. Four cam-operated legs are provided for raising the machine off the floor and leveling the work for machining or drilling.

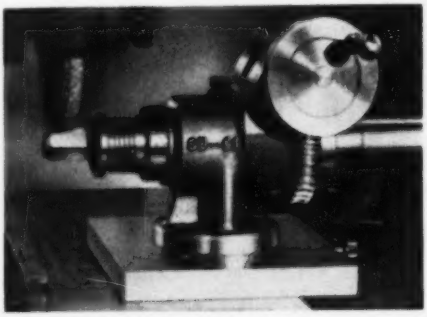


Morley Die Handler



Attachment Adapts Lathes for Boring, Drilling, Reaming, and Other Operations

The "Du-Ona-Lathe," a vertical rotary attachment which can be quickly installed on a lathe for use in performing a variety of boring, drilling, reaming, milling, graduating, facing, layout, and other operations, is now being manufactured by Allen Mfg. Co., 22-76 Steinway St., Long Island City 5, N. Y. Said to fit all 9-inch South Bend lathes, with other models available for 9 and 10-inch lathes, the attachment



"Du-Ona-Lathe" set up on a surface grinder for grinding hexagon punch

can also be used on a surface grinder in forming triangular, hexagonal, octangular, or other shaped punches and tools.

The Du-Ona-Lathe is compactly designed and has a massive Meehanite metal body for rigidity and permanent accuracy.

Utility Grinder Features Adjustable Tool Rests

The Lima Electric Motor Co., Dept. AB5, Lima, Ohio, has announced a 6-inch deluxe utility grinder for use in toolrooms, machine shops, schools, manufacturing plants, and so on. Designated as the Model A, the grinder features dynamically balanced rotors; integrally cast wheel guards; adjustable tool rests which may be tilted for angular grinding; fast-grinding long-wearing abrasive wheels; heavy duty off-on toggle switch; cast iron base; 7½-foot three-conductor rubber-covered cable with unbreakable plug; prelubricated sealed ball bearings; and ¾ h. p. 3,450 r. p. m. dustproof motor.

CAMS

Our ROWBOTTOM cam cutting facilities are at your disposal for your cam requirements.

We Solicit Your Inquiries.

BLOOMFIELD TOOL CORP.

37 FARRAND ST. BLOOMFIELD, N. J.

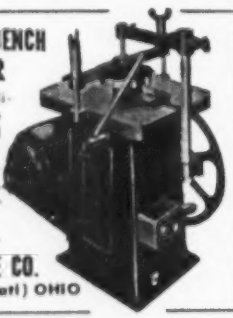
READING BENCH KEYSEATER

Portable — move directly to job; a time saver for both small and large shops.

3¼" stroke; adaptable for other work.

Low first cost — prompt delivery.

Good dealers wanted.



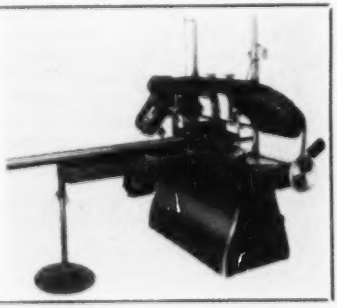
READING MACHINE CO.

READING (Cincinnati) OHIO

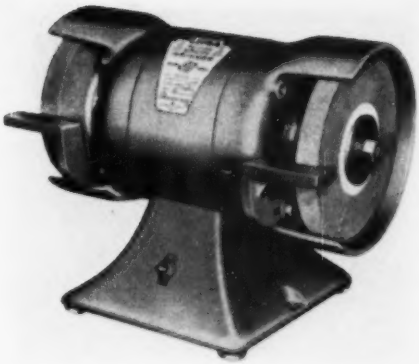
METAL CUTTING SAWS---*built by the pioneers in this field*

No "jack knife" action here! These machines operate smoothly, evenly—raise and lower hydraulically. Semi or fully automatic cutting as you select.

Unlike other saws supported ON their blades, the W. F. Wells unit carries and supports its blade for trouble-free performance, much longer blade wear. Two models: 14" x 18" and 9" x 18" capacities. Stock stands, coolant systems, bar feeds, etc., also available. Write for literature today!



W. F. WELLS & SONS, *Three Rivers, Mich.*



Lima Model A Deluxe Utility Grinder

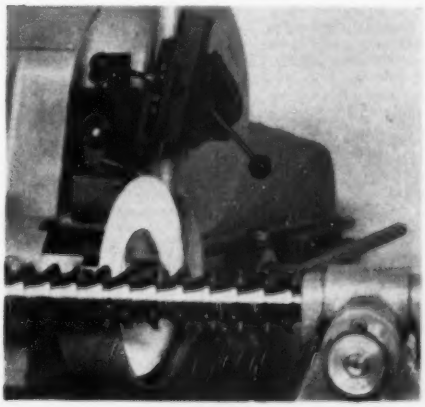
The grinder is available in either standard red or machine tool gray and has a net weight of 37 pounds.

Grinding Wheel Dresser

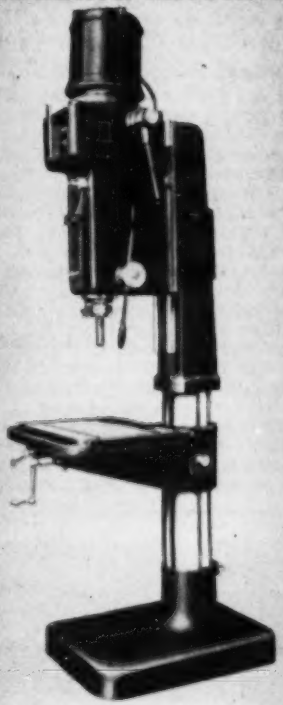
Known as the "Dymon-ize," a grinding wheel dressing attachment designed for use on broach sharpeners has been made available by Colonial Broach Co., Box 37, Harper Station, Detroit 13, Mich. The unit consists of an adjustable mechanism which can be used to produce a fine finish on both the radius and sides of a broach grinding wheel.

The linkage which covers the arc of travel of the diamond point in the dresser is such that any radius up to $\frac{1}{8}$ inch

"Dymon-ize" Wheel Dresser mounted on broach sharpener



VARIA • RAPID
DRILLING MACHINES



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Round or box columns.
Precision construction.
Many unusual features.
Good deliveries.

Write for illustrated folder and complete specifications.

KLINGELHOFER
MACHINE TOOL COMPANY
WESTFIELD NEW JERSEY

can be readily dressed by a single adjustment. The unit has two control handles—one for dressing radii and one for dressing the side of the wheel tangent to the radius.

Filterless Dust Collector Exhausts Cleaned Air to Out-of-Doors

Rated at 885 c.f.m. with 3-inch static suction, the "Dustkop" Model 8N50 dust collector illustrated herewith, product of Aget-Detroit Co., 207 Main St., Ann Arbor, Mich., is recommended especially where outside exhaust of cleaned air is required due to state regulations or to the presence of toxic fumes or vapors. The unit occupies a floor space of 20 x 30 inches and includes a self-cleaning paddle wheel fan direct driven by a ¾ h.p. continuous duty motor which is said to be capable of handling dust originating from grinding, buffing, or polishing wheels up to 12 inches in diameter, as well as multiple abrasive or sanding belts, and other equipment.

The dust-laden air enters the unit at the 5-inch diameter inlet. Dust, dirt, chips, and so on, are removed from the air in a cyclone separator and deposited in a compartment comprising the base of the unit. The cleaned air is exhausted to the outdoors through an outlet at the top of the cyclone.



"Dustkop" Model 8N50 Dust Collector

Beverly THROATLESS SHEAR

Cut any Shape... STRAIGHT OR IRREGULAR



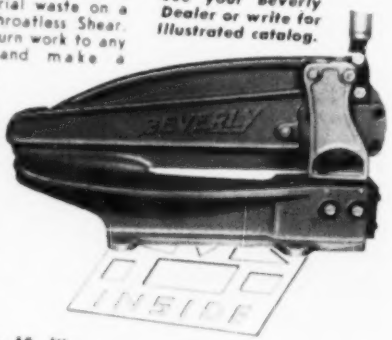
B-3 with Ball Bearing Hold Down

Make any cut — curved, straight or irregular, faster, easier and better with less material waste on a Beverly Throatless Shear. You can turn work to any position and make a clean cut as you go. Handles heavy gauges with ease — lighter metals without distortion. 4 models—capacities 18 gauge to 3/16" mild. All shears equipped with High Carbon, High Chrome Blades.

INSIDE SLOTTER

8" Reach—16 ga. cap. Makes inside slotting cutting faster, easier, cleaner. Punch and die arrangement of 5 blades assures accuracy, clean cutting action. Cuts 2½"x1/16" slot at one stroke. Throat design permits pivoting work at any point in stroke for special inside cuts. Note sample cuts at left.

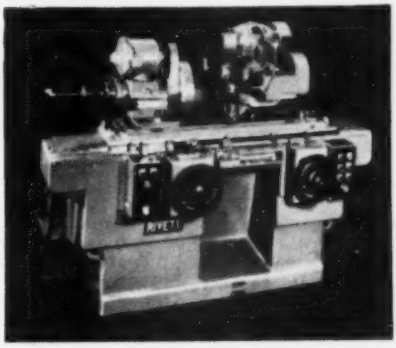
See your Beverly Dealer or write for Illustrated catalog.



BEVERLY SHEAR MFG. CO., 3000 W. 111th St., Chicago 43, Ill.

Machine Adaptable to Internal and External Grinding

A fully universal wheelhead is an outstanding feature of a hydraulic grinder now being offered by Rivett Lathe & Grinder, Inc., Brighton 35, Boston, Mass. Designed to swivel 180 degrees and to accommodate both internal and external spindles, the wheelhead is said to eliminate dual work setups for internal and external grinding.



Rivett 1024 Universal Hydraulic Grinder

The Rivett 1024 Grinder can be used for small, large, and deep-hole grinding; straight and long shaft, diameter and shoulder grinding; and other grinding operations. The machine is provided with internal spindle speeds from 6,000 to 35,000 r.p.m. and includes a micrometer table stop and fine feed for shoulder and blind-hole grinding; sine bar for setting the workhead on the table swivel for accurate tapers, and double swivels on the cross slide for two-angle internal and external grinding. Grinding wheel feed controls are located at the operator's right hand and table traverse controls at the left hand.

Device Automatically Shuts Off Power When Overload Occurs

The Anchor Cut-Out Coupling now being manufactured by Anchor Steel & Conveyor Co., 6906 Kingsley Ave., Dearborn, Mich., is described as an automatic device for machine tools, processing equipment, conveyors, and so on, which instantly shuts off the power when an overload due to any cause occurs and resets

COOLEY ELECTRIC HEAT TREATING FURNACES

"a complete service"

BENCH MODEL

For hardening—hardening and drawing—preheating for high speed tool hardening. 4 models, 3 sizes—1850° F. and 2000° F.—**$220 to $480**

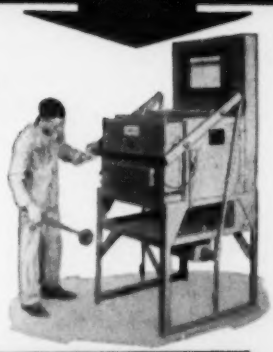
CIRCULATING AIR DRAW

For critical temperature limits. Size 10" x 6" x 14" —900° F. and 1200° F.—**$475 up**

INDUSTRIAL BOX (Shown at right)

Insulated door covers entire front. Natural convection gives quick and uniform heating. 3 sizes: 12" x 8" x 18", 24" or 36". Single or 3 phase operation—**$935 to $1460**

For process application. Batch, pusher or conveyor type. With or without circulation. Electric or gas fired.



free "Shop Notes on Heat Treating of Steels"

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ELECTRIC MFG. CORP.
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INDIANAPOLIS MACHINERY EXPORT CORP. • EXPORT MANAGER, 44 WHITEHALL ST., NEW YORK, NEW YORK

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*CARBON STEEL
DROP FORGED
CHAIN PIPE WRENCH

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D & M AUTOMATIC PRESS GUARD



No Springs
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No Cables
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Fits Any Machine
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Low Initial Cost
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Low Maintenance
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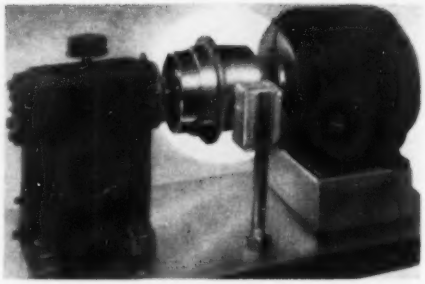
• This punch press guard meets the most exacting standards of safety engineers and safety laws. Permits operator to feed the press without hindrance.

Write for complete information.

Immediate Delivery

D&M GUARD Co.

820 Revere Ave. N. Tonawanda, N. Y.



Anchor Cut-Out Coupling set up for use

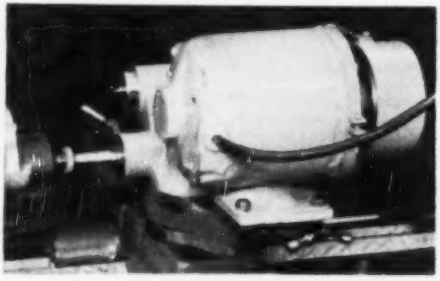
itself automatically, thus preventing sheared pins. Said to combine the features of a flexible coupling with the torque sensitive protection of the company's cut-out pulley, the coupling is furnished in two sizes and with working ranges from 10 to 2,000 inch- pounds torque.

Internal Grinding Attachment

A precision internal grinding attachment for lathes and other machine tools has been developed by South Bend Lathe Works, South Bend 22, Ind. The attachment is powered by a 1/6 h.p. 3,450 r.p.m. a.c. motor which is compound belted through an intermediate shaft to obtain a quill spindle speed of 30,000 r.p.m. The grinding wheel and intermediate shaft spindles operate on high precision, high speed ball bearings which require no adjustment. Lubrication is supplied from built-in oil wells.

Four arbors are supplied, the longest permitting a hole 3⅞ inches deep to be ground when using a 1-inch wheel. Four grinding wheels for these arbors are included. In addition, a ⅛-inch chuck is supplied so that the various sizes and

South Bend Internal Grinding Attachment

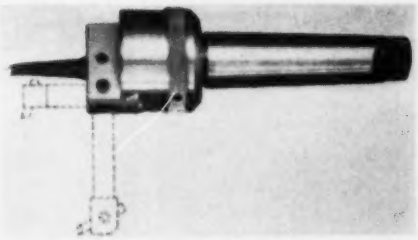


shapes of mounted grinding wheels may be used and holes down to ⅛ inch may be ground.

Improved Boring Tool Provides Extreme Accuracy

The Maxwell Co., 325 Broadway, Bedford, Ohio, has announced an improved design of its E-Z Set Boring Tool to facilitate setting up, increase accuracy, and assure maximum ease of operation. Improvements include increased tool rigidity through the incorporation of larger dovetail areas; ground fit male and female dovetail; micrometer-like adjustment which is said to provide accuracy to within 0.0002 inch; and elimination of distorting slots or gibs.

Fabricated of chrome-nickel-molybdenum and nickel-molybdenum alloys, the improved tool also features modified square type threads on the scroll mechanism to reduce backlash to a minimum and augment tool rigidity and accuracy. The tool is available in models with maximum boring bar capacities of ½, 1, and 1½ inches and covering a boring range of from ⅜ to 20 inches. Boring bars and socket keys are furnished as standard



Maxwell Improved E-Z Set Boring Tool

equipment with all models, which include interchangeable shanks that make them readily adaptable for use in jig borers, milling machines, boring mills, automatics, and other machine tools.

Universal Joint Reduces Friction Heat

Curtis Universal Joint Co., Inc., Springfield 7, Mass., has announced a "Lo-Friction" Universal Joint which is available in single or double-joint form for 1¼-inch o.d. or larger solid or bored hubs, round, keyed or splined shafts. Designed pri-

MIRROR FINISHES

on dies, tools, molds and parts IN MINUTES instead of hours!

Star-Dust Laboratory-Graded

PURE DIAMOND LAPPING COMPOUNDS and DIAMOND POWDERS

Most accurately graded abrasive ever produced. Saves over 78% in labor and time. In all grit sizes as fine as .0001". Available in ophthalmic-tipped tubes or in new applicator gun that delivers accurate minimum quantities to individual jobs and eliminates all waste.

NEW STAR-DUST DIAMOND Wheels!

for Internal Grinding

SAVE YOU MONEY 3-WAYS-IN-1!

1. LONGER LIFE . . . 3 or 4 times more durable than wheels of the past.
2. CUT FASTER . . . they hold a richer content of diamond powder.
3. MORE ACCURATE . . . made with the world's most accurately graded diamond powders.

Available in all sizes from .046 and .090 up to 2" diameter.

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New York 19, N. Y.
Plaza 7-8396

"STAR DUST"

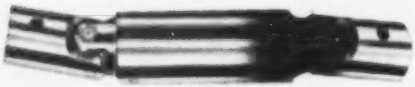


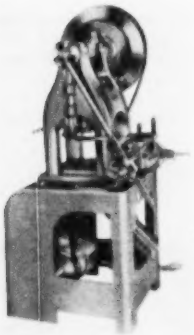
Illustration showing use of Curtis "Lo-Friction" Universal Joint at driving (left) end and Curtis Standard Joint at driven (right) end of a shaft employed in conjunction with dynamometer test.

marily for industrial application where joint friction heat or kinetic energy must be dissipated rapidly, the joint features a center block which is designed to minimize bearing surfaces and provide for adequate and constant lubrication, thus reducing friction heat.

The accompanying illustration shows a Curtis Lo-Friction Universal Joint at the driving (left) end and a Curtis standard joint at the driven (right) end of a shaft used in a dynamometer test with load and angle increased beyond safe limits. The standard joint shows excessive heating—approaching failure—while the Lo-Friction Joint operated with minimum heat and handled the overload successfully.

8-Ton High Speed Press

For more complete coverage in the high-speed automatic press field, Di Machine Corp., 2714 W. Irving Park Rd., Chicago 18, Ill., has added an 8-ton



Diebel Hi-Speed 8-Ton Automatic Press

model to its Diebel line of 5 and 12-ton presses. Features include a cylinder type ram which slides in an adjustable bronze sleeve for maximum accuracy and long life; a variable speed drive for selecting any speed from 110 to 350 strokes per minute; and a rugged precision built-in roll feed, either single or double construction, which is easy to set and maintains a high degree of accuracy.

NEW 7½ TON PUNCH PRESS OFFERS 9" DIE SPACE!



Write for FREE circulars

Ample working space for easier tooling, feeding, ejection of large slugs.

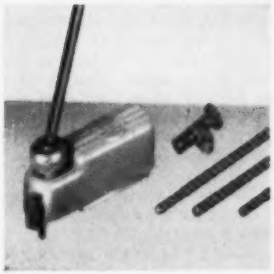
ALSO AVAILABLE:
1-Ton and 4-Ton Standard, and 4-Ton Deep-Throat Models.

benchmaster PUNCH PRESSES AND MILLERS

2952 West Pico Boulevard, Los Angeles 6, California

New MITI-MITE *MAGNETIC HOLDERS*

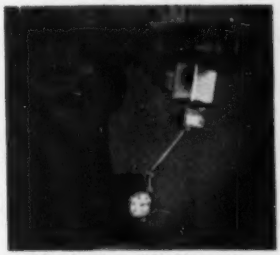
A Third Hand for Machinists



New Heavy Duty Magnetic Base Holder for Indicators

Mounts equally well on flat or curved surface. Duplex type magnet . . . pull approximately 100 pounds. Eliminates hazardous clamping. Magnet has fingered type release for easy positioning. Holds any indicator up to 3 inch in dia.

Catalog #150—$15.50



Eliminates All Clamping

Miti-Mite Magnetic Holder mounts on any round or flat steel surface. Holds test indicators, saves time trying to find suitable place to clamp. Alnico magnet 50 lb. pull. Pull socket and swivel arm construction.



Concentrated Lighting

Miti-Mite Handi-Lite with magnetic base ideal for dark hard-to-get-at corners and jobs requiring concentrated lighting. Fitted with 40 W bulb, adjustable shield prevents glare in operator's eyes.

PRICE LIST

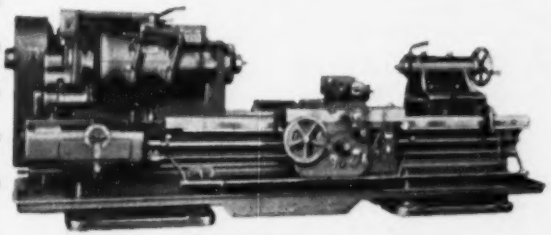
#100 Indicator Holder $7.50 **#200 Handi-Lite $8.50**

#300 Combination of both $15.50

Order from your mill supply dealer or send order with name of your mill supply dealer. Ask for bulletin #602.

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Boyé & Emmes are exclusive manufacturers of good, rugged, dependable lathes, which meet the requirements of precision operations throughout industry. Simplicity, ease of operation, power, rigidity, accuracy and long life are incorporated in our modern machine tools.

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125 CALDWELL DRIVE • CINCINNATI, OHIO

New Shop Literature

Drill Jig Template Sheets. Designed to expedite drafting in machine and tool design, full size individual template tracing sheets covering rack and pinion and spring type drill jigs are now available to individuals addressing requests on their company letterheads to Slewek Tool Co., 2860 E. Grand Blvd., Detroit 2, Michigan.

Spindle Nose Lathe Chuck. The Jacobs Mfg. Co., 35 Jacobs Rd., West Hartford 10, Conn., has published an eight-page two-color bulletin (No. 50-LC2) which illustrates and describes in detail a collet type spindle nose lathe chuck that is designed to firmly grip parts of various material without marring or scratching. Data on chuck and collet prices are included.

Combination Shear, Punch, and Coper. Bar shearing, punching angles, coping angles, notching, plate slitting, angle shearing, and coping channels are operations that can be accomplished on a single Kling Combustion Shear Punch and Coper, features of which are fully illustrated and described in a bulletin prepared by Kling Brothers Engineering Works, 1328 N. Kostner Ave., Chicago 51, Ill. Complete specifications regarding the machine are included, in addition to other helpful information concerning the economies provided by the use of the machine.

Band Saw Machine Accessories. A six-page two-color bulletin published by Carter Products Co., 47 Mt. Vernon Ave., N. W., Grand Rapids, Mich., presents illustrated and descriptive information on a line of band saw machine accessories, including micro-precision band saw guides; rigid wheels and quick-change demountable tires; "Jiffy" band saw tires; and guide-line lights for straight-line sawing and other applications.

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No production delays waiting for Maurey V-pulleys, V-Belts, or V-Drives. Fast Maurey service helps speed your output.

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Bulletin OEM-2000 informs about Hi-Q V-PULLEYS

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High Speed DRILLS



Straight Shank
No. 1 - 60

No. By Gage	Length Inches	Our Price Net Each
1 to 10	6 1/4	$1.00
11 to 20	5 3/4	.90
21 to 30	5 3/8	.80
31 to 40	5 1/4	.70
41 to 50	4 1/2	.60
51 to 60	4 1/4	.50

Straight Shank

Size Inches	Length Overall Inches	Length Flute Inches	Price Each Net
1/8	12	9	$1.65
9/64	12	9	1.65
5/32	12	9	1.65
11/64	12	9	1.65
3/16	12	9	1.65
13/64	12	9	1.76
7/32	12	9	1.76
15/64	12	9	1.95
1/4	12	9	1.95
17/64	12	9	2.05
9/32	12	9	2.05
19/64	12	9	2.20
5/16	12	9	2.20
21/64	12	9	2.50
11/32	12	9	2.50
23/64	12	9	2.75
3/8	12	9	2.75
25/64	12	9	3.05
13/32	12	9	$3.05
27/64	12	9	3.30
7/16	12	9	3.30
29/64	12	9	3.60
15/32	12	9	3.60
31/64	12	9	3.60
1/2	12	9	3.60

Taper Shank

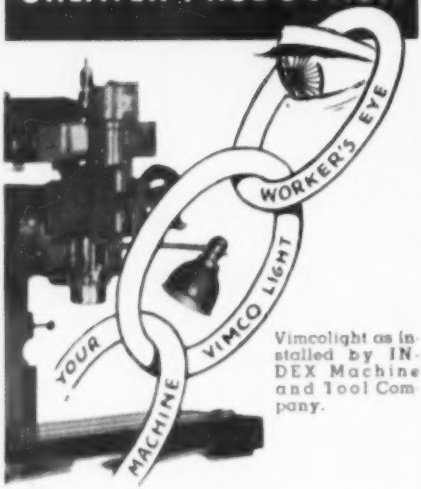
Size Inches	Length Overall Inches	Length Flute Inches	Price Each Net
17/32	15	12	$7.00
9/16	15	12	7.70
19/32	15	12	8.25
5/8	15	12	8.80
21/32	15	12	9.00
11/16	15	12	9.10
23/32	15	12	9.35
3/4	15	12	9.50
25/32	15	12	10.50
13/16	15	12	12.00
27/32	15	12	12.65
7/8	15	12	13.20
29/32	15	12	13.75
15/16	15	12	14.30
31/32	15	12	15.40
1	20	15	17.60
1-1/16	20	15	18.70
1-1/8	20	15	19.80
1-3/16	20	15	22.00
1-1/4	20	15	24.00

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for better vision and
GREATER PRODUCTION



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Machine tool designers . . . install Vimcolights on your machines and make your design more **complete** . . . more **desirable.** Vimcolights supplement general plant lighting . . . keep production up . . . prevent eye fatigue . . . and create good-will. They are easy to install, highly versatile and sturdy. Special applications can be handled by our experienced design staff.



Bulletin 74 illustrates our complete line

VIMCO MFG. CO., Inc.

SINCE 1919

111 Brayton Street **Buffalo, N. Y.**

"It's Easy to Bend" is the title of a 32-page bending manual published by O'Neil-Irwin Mfg. Co., 306 8th Ave., Lake City, Minn., the purpose of which is to illustrate and describe the multitude of bending operations that can be easily performed without special engineering knowledge, provided a few elementary principles are observed. Data are presented regarding product design, selection of material, choice of bending machine, and tooling the bender. Types of bending operations described include centered eye bending, off-center bending, circle bending, zero radius bending, scroll bending, square bending, spring or coil bending, loop and spiral bending, tube bending, edgewise bending, channel bending, angle bending, wide material bending, and other operations.

Drill Jigs. An illustrated and descriptive circular on "Johns" Drill Jigs equipped with universal jaws for use in second operations such as drilling, tapping, threading, chamfering, end milling, and so on, is now available from Heuser Mfg. Co., 1638 N. Paulina St., Chicago 22 Ill.

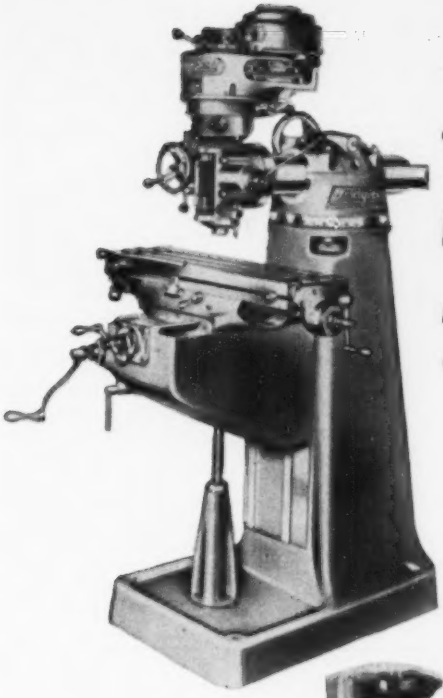
Carbide Grade Chart. Adamas Carbide Corp., Box 149, Harrison, N. J., has published a revised edition of a useful chart of all tungsten carbide manufacturers' grade recommendations for chip removal, wear, and impact applications. The easily-read letter size chart, which is suitable for inserting in a three-ring notebook, posting as a wall chart, or reference filing, indicates proper grades for chip removal on steel and non-ferrous metals for roughing cuts through precision boring. Wear and impact applications are also covered. A feature of the chart is the adoption of symbols C-1 through C-14 to indicate each application.

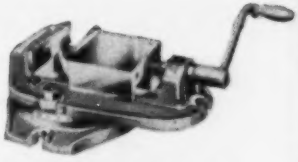
Spiral Milling Attachments. The Cincinnati Milling Machine Co., Cincinnati 9, Ohio, has issued two bulletins on universal spiral milling attachments. Bulletin No. M-1718 contains illustrated, descriptive, and tabular information on an improved design of universal spiral milling attachment having an anti-friction bearing mounted spindle with nose conforming to No. 40 Standard, and designed primarily for the milling of helical and spiral gear teeth. Bulletin No. M-1715 presents data on a new heavy duty universal spiral milling attachment which is arranged for driving from the machine spindle and is designed for the larger, more powerful Cincinnati milling machines from No. 3 dial type to No. 6 dual power dial type.

Bridgeport

TURRET MILLING MACHINES ... now

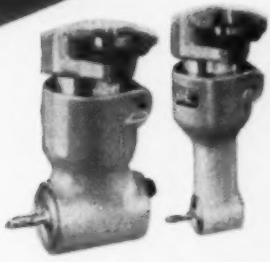
perform more operations on heavier work





MILLING MACHINE VISE

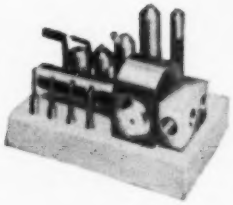
Streamlined for greater attractiveness, this improved vise provides greater gripping power, a large diameter screw assuring rigid holding. A coolant trough adds to the utility of this vise. Made in 5" x 3½" and 6" x 5" jaw openings.



RIGHT ANGLE ATTACHMENTS

(Left) Heavy duty attachment which is made in two sizes. It is applicable to both the Master and the 1 HP Bridgeport heads.

(Right) Light duty type, designed for milling and drilling narrow, deep molds and cavities.



No. 2 BORING HEAD

This attachment provides the means of boring holes up to 6" diameter. It is applicable to the Bridgeport 1 HP Milling, Drilling and Boring Attachment.

With the advent of the 1 HP head, the capacity of the "Bridgeport" has been greatly increased. And with the addition of the attachments for this head, a much wider variety of work can be handled. Thus all the advantages of speed, convenience and accuracy which have won universal acceptance for "Bridgeports" in tool rooms, die shops and on production lines everywhere, are made available for the handling of heavier, more difficult work.

The use of these attachments on "Bridgeports" already in service will greatly extend the versatility of these machines and add many more hours of productive work.

Ask for further details.

Bridgeport MACHINES, INC.

Bridgeport Connecticut

Manufacturers of High Speed Milling Attachments and Turret Milling Machines

Self-Centering Drill Turret. Howe & Fant, Inc., 527 Flaxhill Rd., South Norwalk, Conn., has available a four-page bulletin (No. 5010) which fully illustrates and describes its "Lign-O-Matic" Self-Centering Drill Turret for all consecutive drill press operations, including drilling, reaming, counterboring, and so on, as well as tapping on reversible spindle machines. The bulletin contains information as to the advantages, specifications, and price of the turret, which is designed to fit any standard drill press and is said to permit the drilling of holes up to ½ inch in diameter in any material.

Production Surface Grinders. Mattison Machine Works, Rockford, Ill., has released a 10-page bulletin (No. 847-2RM) which contains illustrations, descriptions, and specifications of vertical spindle surface grinders for the accurate generation of flat surfaces on knife and shear blades, surfacing machine parts, die blocks, gear racks, or other small tools and for general manufacturing and toolroom requirements.

Balls, Clamps, Handles, Chucks, Etc. Reid Tool Supply Co., 709 Baker St., Muskegon Heights, Mich., has available a 36-page pocket-size catalog (No. 151) illustrating, describing, and listing prices and dimensions of plastic and steel ball handles; clamps; crank handles; lathe chucks; fixture units; gage stops; machine, clamping gage, and other handles; machine handwheels; jig feet; knobs; levers; machine set-up block studs, and accessories; magnetic parallels and V-blocks; milling attachments for lathes; ball bearing parallels; quarter turn screws; rest buttons; rotary tables; safety pliers or tongs; T-slot bolts; transfer or spotting screws; trigger stops for dies; vises, and other products.

INDEXING?
INTERMITTENT DRIVE?
USE A GENEVA

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"THOUSANDS OF SIZES"
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AT LAST!
A Low-Priced Dial Type Indicator
Contact can be instantly changed. Double faced. Simultaneous reading front and back.
Double faced dial indicator complete with plated holder including 1/32" and 1/8" contacts—
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1/32" Contact, 1/2" long extension ..... .75
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H.S. Drills, Milling Cutters, Lathe Tools, H.S. and C.S. Taps and Dies, Drill Chucks, Lathe Chucks, Turrets, Special Taps and Dies, Files, Precision Tools, Machine Reamers in 64th sizes, etc. Also large assortment of special and standard Plug and Ring Gauges, both Thread and Cylindrical.

A Complete Line of Machine Shop Equipment

Send for Catalog and Price List.

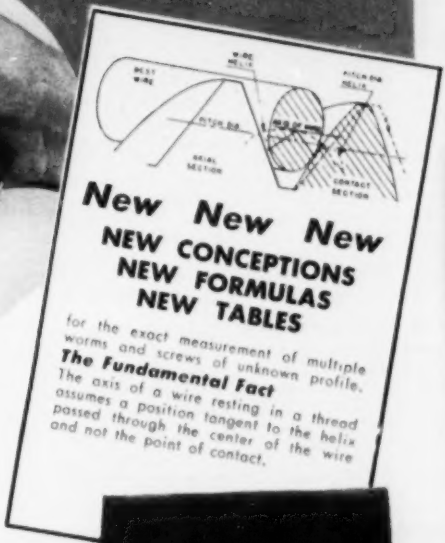
CENTER TOOL CO., 151 CENTRE ST. N. Y. 13

Van Keuren MEASURING WIRES

STANDARD EQUIPMENT...
...everywhere



Measuring the pitch diameter of a 1"-8 National Form thread gage. This method is recommended by the Bureau of Standards.



Van Keuren Measuring Wires are the accepted standard equipment for making pitch diameter measurements of taps, thread gages, precision threaded parts, hobs, worms, splines and gears. Reputable manufacturers of ground taps and thread gages used for the protection and acceptance of threaded holes and nuts use Van Keuren Measuring Wires. You will seldom find them in error if you, too, have Van Keuren Measuring Wires.



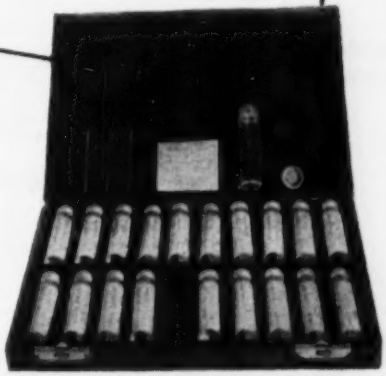
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Vapor Collectors. Bulletin 619 describing how seven representative companies approaching the problem of eliminating vapor and mist from various machining and vapor generating operations is available from Aget-Detroit Co., 1207 Main St., Ann Arbor, Mich. Among the concerns covered are a leading manufacturer of gear hobs, a producer of valves, a user of thread grinders, and a firm that cleans oily parts with an air blast.

Tungsten Carbide Metal Preparation. Metal Carbides Corp., Dept. D., Youngstown, Ohio, has announced an attractive 9 x 12-inch plastic wall hanger showing and describing how tungsten carbide metal is made. Suitable for hanging on a wall or standing on a desk, the plaque explains graphically and competely the steps involved in the preparation of tungsten carbide metal by either the hot press metal or cold press method.

Horizontal Duplex Motor-Driven Compressors utilizing anti-friction roller bearings throughout are illustrated and described in detail in a 28-page two-color bulletin (No. 726-5) published by Chicago Pneumatic Tool Co., 8 E. 44th St., New York 17, New York.

Stock Oilers and Wipers, designed to provide an economical means for cleaning and oiling steel and brass stock as it enters power press dies, is illustrated and described in a circular issued by Durant Tool Supply Co., 155 Orange St., Providence 3, R. I. The circular includes information on the prices of the five sizes in which the oiler is available for handling stock up to 6, 8, 10, 12, and 14 inches respectively.

Portable Precision Surfacer for small surfacing jobs is described and illustrated in a four-page folder available from Reid Brothers Co., Inc., Beverly, Massachusetts.

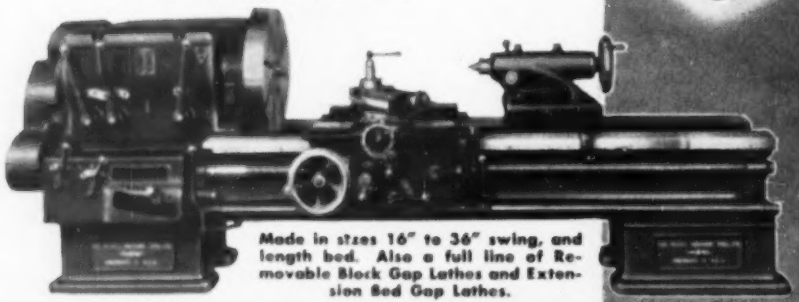
"The Greatest Advance in Lathe Construction" is the title of a six-page bulletin (HLV) issued by Hardinge Brothers, Inc., Elmira, N. Y., which presents the Hardinge Model HLV Lathe with variable speed drive for headstock spindle and independent variable feed drive for carriage and cross slide. Well illustrated, the bulletin provides compete specifications and descriptive information on the lathe, which is designed to fill the gap between a plain precision bench lathe and a heavy duty engine lathe.

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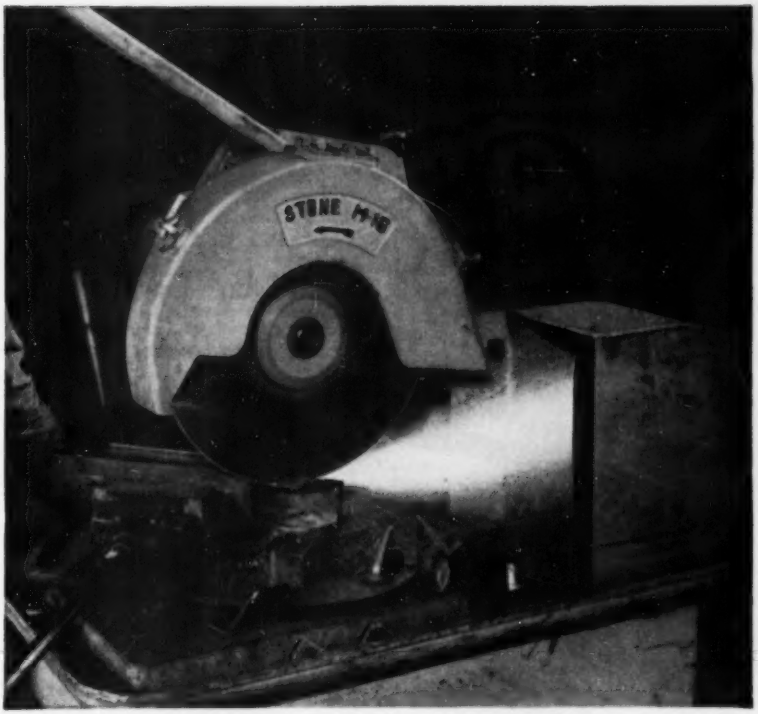
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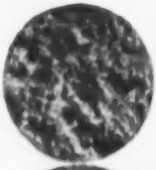
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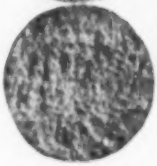
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Triple-Chip Solid and Segmental Circular Saw Blades made by The Motch & Merryweather Machinery Co., 715 Penton Bldg., Cleveland 13, Ohio, are described and illustrated in an eight-page bulletin (No. 201) which includes two tables that provide complete data and specifications for all standard size blades. Also described are two models of automatic saw blade sharpeners for these saws.

Cutoff Wheels. An attractive six-page bulletin (No. 6888C) listing wheel grade recommendations and cutting performance data, as well as operating suggestions for the Delta cutoff machine, has been issued by Abrasive Wheel Dept., Manhattan Rubber Div., Raybestos-Manhattan, Inc., Passaic, New Jersey.

Tool Reconditioning. Rutland Tool Service, 1617 E. McNichols Rd., Detroit 3, Mich., now has available literature regarding the reconditioning of high speed and carbide cutting tools; also a 9 x 11-inch decimal equivalent card.

Portable Electric Tools. The Sales Promotion Dept., Buckeye Tools Corp., Div. 17, 29 W. Apple St., Dayton, Ohio, has issued a catalog featuring a complete line of 360 and 180-cycle portable electric tools, including drills, screw drivers, grinders, sanders, and polishers.

Set Screw Demonstrator. Set Screw & Mfg. Co., 2600 Main St., Bartlett, Ill., is offering the "Zip-Grip" Self-Locking Set Screw Demonstrator which provides a means for comparing the action of a standard set screw with that of the new Zip-Grip Self-Locking Set Screw.

"Broach Sharpeners for Every Purpose" is the title of a four-page bulletin (No. S-50) released by Colonial Broach Co., Box 37, Harper Station, Detroit 13, Mich., which illustrates and describes special sharpening machines for round and for flat broaches, as well as universal machines for handling both types of broaches.

Grinding Wheel Bond. A new vitrified bond for grinding wheels and mounted wheels, designated as "79E" is described in a four-page illustrated folder published by Chicago Wheel & Mfg. Co., Dept. MMS, 1101 W. Monroe St., Chicago 7, Illinois.



Protecting Metals Against Heat Oxidation. A four-page two-color bulletin (No. 45A) issued by Metallizing Engr. Co., Inc., 38-17 30th St., Long Island City 1, N. Y., describes and illustrates several applications of a process for protecting metals against heat oxidation.

Draw-In Collets. A up-to-date listing of popular style collets for all makes of lathes and millers is included in a four-page order Bulletin (No. 50) published by Hardinge Brothers, Inc., Elmira, N. Y.

"Doing Right by Your Hydraulic System" is the title of an 18-page booklet prepared by Sun Oil Co., Philadelphia 3, Pa., which contains facts on oil maintenance, instructions for cleaning systems, and tips on oil testing and draining.

Cut-Out Couplings. A 12-page catalog (No. 58) issued by Anchor Steel & Conveyor Co., 6906 Kingsley Ave., Dearborn, Mich., illustrates and describes Anchor Cut-Off Couplings Automatic Devices for machine tools, processing equipment, conveyors, and so on, which are arranged to instantly shut off the power when an overload occurs and to reset themselves automatically.

Speed Reducers and Gear Sets. Cone-Drive Gears, Div. of Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich., has released a four-page two-color illustrated engineering bulletin on standard Cone-Drive speed reducers and gear sets ranging between 5:1 and 70:1 ratio and from 0.05 up to 555 h. p. capacity.

Numbers shown are page numbers in this issue

— A —

Abrasive Cloth, Paper, Discs, Belts, Stones, Etc., 42, 49, 74, 82, 88, 89, 91, 173, 210, 211, 219, 305
Absorbents, Oil and Grease, 250
Adapters, 79, 344
Air-Operated Equipment (Look for specific item)
Alloys, 137
Angles, 158, 166
Arbors, 257, 336

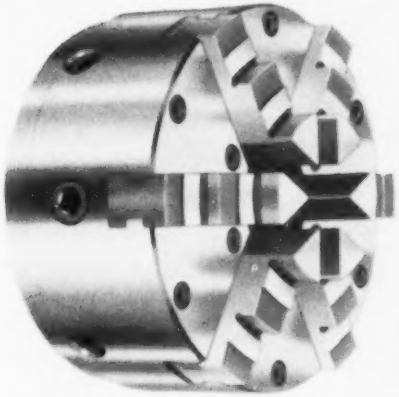
— B —

Balancing Machines, 168A, B, C, D
Balancing Ways, 272
Bar Feeds, Pneumatic, 47
Bases, Index, 208
Bases, Machine, 346
Battery Chargers, 309
Bearings, Bronze, 46
Bearings, Roller, 46
Bearings, Thrust, 283
Belting, V, 186, 390
Benches, Cabinet, 29
Bending Devices, 119, 230
Bending Machines, 37, 131, 216, 261, 352, 371, 373
Bending Rolls, 113
Bins, 73, 220, 279
Bits, Power, 15, 62, 63, 225, 336
Blades, Cutting-Off, 204
Blanks, 349
Blocks, Magnetic, 346
Blocks, Step, 215, 349
Blowers, 364
Bolts, 75
Books, 289
Boring and Milling Machines, Vertical, 11
Boring Bars, 157, 366
Boring, Drilling and Milling Machines, Horizonal, 271
Boring, Drilling and Tapping Machines, Multiple, 28, 83
Boring, Facing and Turning Machines, Precision, 66, 67
Boring Heads, 286, 349, 360, 393
Boring Machines, Second Cover, 271, 311
Boring Mills, 117, 271
Boxes, Shop, 279
Brakes, Press and Bending, 99, 119, 269
Broaches, 86, 87
Broaching Fixtures, 86, 87
Broaching Machines, 8, 9, 31
Brushes, Wire Wheel, 77
Buffers, Portable Electric, 18, 361, 420
Buffing Machines, 58, 420
Burs, 312
Bushings, Drill Jig, 147, 148, 232, 297, 306, 308, 364
Bushings, Sleeve, 147, 260

— C —

Cabinets, 161
Calipers, 344, 374
Cam Making Fixtures, 199
Cams, 304, 374, 382
Carbides, 137, 184
Centering Machines, Automatic, 131
Centers, Lathe, Planer, Miller, Etc., 56, 224, 255, 295, 307, 349, 369, 377
Checking Rolls, 272
Choppers, Scrap, 313
Chucking and Indexing Fixtures, 208, 345
Chucks, Collet, 59, 299, 342, 401
Chucks, Diaphragm, 257
Chucks, Drill, 299, 394
Chucks, Internal, 314
Chucks, Lathe, 59, 263, 299, 394, 401
Chucks, Magnetic, 163, 233, 253, 263
Chucks Tap, 225, 299
Chucks, Universal, 263
Chucks, Wrenchless, 309
Clamps, 147, 277, 294, 297, 368
Clamps, Air, 327
Cleaners, Vacuum, 276
Cleaning Fluid, 325
Clutches, 363
Coil Handling Equipment, 181, 290, 351
Collars, 359
Collets, 69, 199, 295, 342
Compressors, Air, 237
Controlling Devices, 327
Conveyors, 358
Coolant Separators, 177
Coolant Units and Systems, 339, 382
Counterbores, 54, 105, 201, 235, 255, 336
Countersinkers, 352
Countersinks, 54, 180, 312
Couplings, Flexible, 46, 356, 363
Cranes, 176
Cranks, 346
Cross Slides, 355
Cut-Off Machines, 131, 169, 218, 302, 419, 420
Cut-Off Wheels, 88, 285, 397
Cutters, Die Sinking, 336
Cutters, Dovetail, 336
Cutters, Gear, 183
Cutters, Key Seat, 336
Cutter Sharpening Machines, 8, 9
Cutters, Milling, First Cover, 54, 60, 76, 139, 183, 235, 255, 311, 336, 394
Cutters, Rotary, 105, 180
Cutters, Shaper, 92

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Cylinders, Hydraulic and Pneumatic. 194, 195, 265, 327, 379

— D —

Deburring Compounds. 375
Demagnetizers. 263, 377
Diamond Compounds. 182, 387
Diamond Wheels. 370, 387
Die Casting Machines. 367
Die Cushions, Pneumatic. 345
Die Filing Machines. 354
Die Flippers. 56
Diemakers' Supplies. 267
Die Making Machines. 165
Dies. 3, 81, 137, 209, 213, 235, 259, 394
Die Sets. 125, 267, 287, 337
Dividing Heads. 124, 263, 339
Drawbars. 295
Dressing Fixtures, Grinding Wheel. 56, 277, 348
Drill Chip Breakers. 319
Drill Heads. 50, 114, 116, 145, 185, 315
Drilling and Centering Machines. 23
Drilling and Tapping Units. 80, 351
Drilling Attachments. 215
Drilling Machines, Bench. 7, 37, 52, 53, 80, 141, 340
Drilling Machines, Horizontal. 103, 311
Drilling Machines, Multiple Spindle. 7, 52, 53, 311, Third Cover
Drilling Machines, Radial. 14, 41, 103, 117
Drilling Machines, Vertical. 14, 103, 311, 383, Third Cover
Drills, Center, Core, Twist, Square, Etc.. 20, 21, 44, 45, 54, 89, 105, 149, 183, 201, 209, 235, 255, 336, 362, 391, 394
Drills, Portable Electric. 65, 237, 361, 409, 420
Drills, Portable Pneumatic. 237
Drives. 39, 43, 186, 344, 390, 394
Drives, Motor. 247, 370
Drums, Grinding, Sanding, Etc.. 142
Duplicating Machines. 19
Dust Control Equipment. 217, 273, 315, 323, 377

— E —

Engines, Diesel. 237
Engraving Machines. 174, 288
Etchers. 291, 377

— F —

Facing Heads. 360
Fastener Units. 370
Feed Fingers. 69
Feed Tables. 357
Feed Units. 178, 322, 327, 339, 382
Files. 129, 312, 394, 403
Files, Rotary. 15, 77, 312, 403
Filing Machines. 39, 43, 292
Filters. 168
Finishing Machines, End. 131
Flame Hardening Apparatus. 8, 9
Flats, Glass Optical. 347
Flexible Shaft Equipment. 15, 38, 40, 141
Floats. 329
Furnaces, Heat Treating. 152, 234, 243, 281, 335, 385

— G —

Gage Blocks. 28, 39, 43, 395
Gages. 6, 33, 78, 115, 148, 257, 275, 301, 303, 394, 395
Gears and Gear Units. 46, 239, 292
Grabs. 73
Grinders, Abrasive Band and Disc. 350
Grinders, Abrasive Belt. 293
Grinders, Air. 168, 305
Grinders, Bench. 58, 65, 231, 309, 361, 409, 420
Grinders, Carbide Tool. 179, 287
Grinders, Center. 58
Grinders, Centerless. 10
Grinders, Chaser. 310
Grinders, Chip Breaker. 287
Grinders, Contour. 39, 43, Third Cover
Grinders, Cutter and Tool. 30, 39, 43, 55, 58, 165, 179, 271, 284
Grinders, Die. 77
Grinders, Disc. 17, 58
Grinders, Drill. 55, 58, 165, 271, 299
Grinders, Face Mill. 165
Grinders, Hand. 141
Grinders, Internal. 287
Grinders, Jig. 56, 79
Grinders, Knife. 300
Grinders, Lathe. 58
Grinders, Pedestal. 30, 58, 179, 246, 279, 287, 361, 420
Grinders, Portable and Tool Post. 141, 420
Grinders, Portable Electric. 18, 44, 45, 65, 77, 361, 409
Grinders, Profile. 8, 9, 354, 381
Grinders, Snagging. 30, 58
Grinders, Surface. 33, 43, 55, 89, 231, 310, 313,
Grinders, Swing Frame. 124, 278
Grinders, Tap. 55
Grinders, Universal. 12, 13
Grinding Fixtures and Attachments. 30, 39, 43, 90, 238
Grinding Heads. 143
Grinding Wheels. 42, 49, 68, 82, 88, 89, 210, 211, 219
Guards, Press. 386

— H —

Hammers, Portable Electric. 65, 409
Handles, Hammer. 352
Handles, Machine. 166, 346
Hand Tools, Power (Look for specific item)
Handwheels. 166, 346
Hardness Testing Devices. 189, 285, 374, 405
Hinges. 270, 320
Hobbing Machines. 106, 107
Hobs. 105, 106, 107, 183, 235
Hob Sharpening Machines. 106, 107
Holders, Bit. 225
Holders, Finger. 199
Holders, Indicator. 389
Holders, Magnetic. 289
Holders, Tap. 338, 341
Holders, Tool. 60, 92, 157, 201, 204, 338, 378
Holders, Wheel. 68
Hones. 328



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Honing Machines, 84, 311, 328
Hopper Units, Motorized, 221
Hydraulic Equipment (Look for specific item)

— I —

Indexing Heads, 307
Indexing Machines, Third Cover
Indicators, 123, 127, 275, 394

— J —

Jig Borers, 56, 103
Jigs and Fixtures, 257
Joints, Universal, 46, 225, 344, 356

— K —

Keys, Machine, 285, 289
Keys, Socket Screw, 75, Fourth Cover
Keys, Woodruff, 285, 289
Keyway Cutting Machines, 382, Third Cover
Knives, Band, 123
Knobs, Machine, 166, 346, 349

— L —

Lapping Compounds, 293, 387
Laps, 377
Lathes, Automatic, 23, 27, 32, 41, 168A, B, C, D
Lathes, Bench, 7, 159
Lathes, Engine and Toolroom, 7, 16, 23, 24, 25, 32, 41, 66, 67, 100, 159, 167, 271, 354, 389, 396
Lathes, Speed, 420
Lathes, Turret, 4, 27, 124, 168A, B, C, D, 175
Layout Materials, 144, 292, 306
Levers, 346
Lighting Equipment, 200, 298, 389, 392
Light Wave Measuring Equipment, 395
Lockers, 161
Lubricants, 154, 370
Lubricators, 168

— M —

Magnifiers, 222
Mandrels, Expanding, 329, 336
Marking Machines, 213, 258, 291
Metallizing Equipment, 188, 245
Micrometers, 301
Milling Attachments, 64, 199, 282, 301, 393
Milling Machines, Bench, 282, 339, 388
Milling Machines, Hand, 205, 251, 282
Milling Machines, Horizontal, 8, 9, 130, 187, 205, 271
Milling Machines, Turret, 393
Milling Machines, Universal, 8, 9, 34, 35, 187, 271
Milling Machines, Vertical, 8, 9, 130, 205, 271, 376
Mills, End, 15, 20, 21, 54, 105, 183, 235, 255, 311, 318, 336
Mills, Face, First Cover
Mills, Midget, 180
Motors, 207, 217, 309
Mounted Points and Wheels, 77, 88, 303
Mountings, Machine, 223

— N —

Nibblers, 65, 299, 354
Notchers, 119
Numbering Machines, 213, 283
Nut Drivers, 221
Nut Runners, Portable Electric, 409
Nut Setters, Portable Electric, 65, 420
Nuts, 215, 324, 344, 349
Nuts, T, 349

— O —

Oilers, 339
Oil Groovers, 287, 315
Oiling Machines, Spindle, 287
Oils, Cutting, 8, 9, 151, 171, 326

— P —

Pantographs, 19, 376
Parallels, 158, 166, 346
Parters, Rod, 119
Parts, Machine, Aircraft, Production, Etc., 237, 287, 289, 344
Pillow Blocks, 46, 272
Pins, 285, 289, 293, 324, 364
Pins, Stop, 266
Planers, 271
Plates, Angle, 297
Plates, Retainer, 81
Plates, Surface, 158, 166, 304
Pliers, 368
Plugs, Pipe, 75
Pointers, Bar, 352
Polishers, Portable Electric, 361, 409
Polishing Machines, 48, 58
Polishing Supplies, 375
Polishing Units, 65
Presses, Air, 327
Presses, Arbor, 329
Presses, Forcing, 153
Presses, Hydraulic, 51, 272
Presses, Power, 51, 172, 278, 317, 365, 370, 380
Presses, Punch, 164, 227, 278, 388
Presses, Sub, 112
Profiling Machines, 131
Pulleys, 186, 340
Pumps, Coolant and Lubricant, 343, 413
Pumps, Hydraulic, 153
Pumps, Vacuum, 217, 237
Punches, 3, 81, 283
Punching Machines, 37, 113, 119
Punching and Notching Units, Hole, 192, 193
Punch Press Sets, 349
Pushers, Master, 199

— Q —

Quills, 141

— R —

Racks, Bar and Tube, 363
Racks, Machine, 285
Racks, Storage Bin, 73, 220
Ratchets, 239

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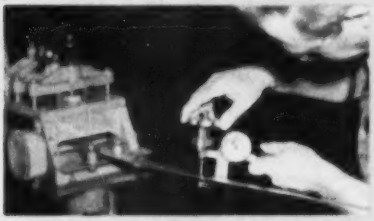


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WALTHAM 54, MASS.

Ratiometers, 46
Reamers, 15, 60, 89, 105, 149, 180, 183, 235, 255, 295, 336, 394
Rectifiers, 283
Reductors, 46
Regulators, 168
Riveting Machines, 301, 376
Rolling Mills, 51
Routers, 420

— S —

Sandblast Equipment, 217
Sanders, Portable Electric, 18, 44, 45, 65, 361, 409
Sanders, Portable Pneumatic, 18
Sanding Drums, 77
Sanding Machines, 124
Saw Blades, Band, 22, 39, 43, 123, 127, 229, 236
Saw Blades, Circular, 54, 85, 145
Saw Blades, Hack, 123, 127, 236, 409
Saw Frames, Hack, 236
Saw Guides, Band, 295
Sawing Machines, Band, 7, 22, 33, 249, 292, 342, 382
Sawing Machines, Circular, 72
Sawing Machines, Friction, 113
Sawing Machines, Hack, 203, 263, 292, 313, 380
Saw Sharpening Machines, 226, 300
Saws, Portable Electric, 44, 45, 65, 361, 409
Scrapers, Hand and Power, 272
Screw Drivers, Portable Electric, 44, 45, 65, 191, 221, 409, 420
Screws, Cap, Set, Socket and Machine, 75, 228, 239, 324, 347, 349, 372, Fourth Cover
Screws, Lock, 147
Screws, Transfer, 256, 348
Services: Milling, Grinding, Lapping, Rebuilding, Repairing, Business, Etc., 105, 306, 320, 398, 399
Shapers, 241, 380
Shearing Machines, 37, 113, 119, 384
Shearing, Punching, and Coping Machines, Combination, 113
Shears, Portable Electric, 44, 45
Shelving, 161
Shims, 305, 311
Sleeves, 260
Slotting Machines, 36, 271, 352, 384
Sockets, 225
Soldering Materials, 252
Spacing Collars, Arbor, 291, 311
Spacing Table Machines, 103
Special Machinery, 50, 72, 80, 168A, B, C, D, 212, 221, 235, 271, 311
Speed Reducers, 5
Spindles, 79, 143, 287, 344
Spot Facers, 336
Spotters, 272
Sprockets, 239
Stamps, 213, 289, 291, 321, 372
Stands, Drill, 65
Steel, Die, 33, 407
Steel, General Purpose, 407
Steel Stock, Ground Flat, 33, 103, 127, 407
Steel, Tool, 33, 39, 43, 62, 63, 415
Step Block Sets, 346, 349
Stock Stands, 382
Stops, Finger, 266
Straightedges, 158
Studs, 215, 324
Stud Sets, 349
Stud Setters, 225
Superfinishing Machines, 168A, B, C, D
Surfacing Machines, Abrasive, 7
Switches, 263

— T —

Tables, Work, 73
Tables, Elevating, 121
Tables, Rotary and Index, 80, 288, 339, 340, 350
Taper Attachments, 362
Tapes, Adhesive, Recording, Etc., 91
Tapes, Measuring, 123, 127
Tap Extractors, 126
Tappers, Portable Electric, 65, 420
Tapping Heads, 114, 315, 341
Tapping Machines, 27, 190, 311, Third Cover
Taps, 15, 60, 89, 104, 209, 235, 259, 336, 353, 394
Thread Rolling Machines, Automatic, 155
Threading Machines, 2, 27, 352, 417
Tool Blanks, 137
Tool Cribs, 274
Tool Kits, Air, 65
Tools, Boring, 307, 347
Tools, Bottoming, 347
Tools, Carbide, 15, 57, 70, 71, 101, 150, 183, 255,
Tools, Chamfering, 180
Tools, Cutting Off, 60
Tools, Deburring, 180, 262
Tools, Facing, 307, 347
Tools, Form, 201, 336
Tools, Internal Threading, 307, 347
Tools, Knurling, 60
Tools, Radius, 254
Tools, Special, 57, 201, 235, 320, 336
Tools, Turning, 255
Tracers, Lathe, 66, 67
Transmissions, Variable Speed, 356
Traps, 329
Trucks, Hand, 73
Tubes, Collet and Pusher, 199
Turrets, Lathe, 345, 394

— V —

Valves, 140, 265, 316, 327, 329
Vise Jaws and Steps, 301
Vises, Bench and Machine, 120, 122, 263, 278, 288, 294, 327, 339, 346, 363, 366

— W —

Wear Parts, 137
Welding Equipment and Supplies, 39, 43, 331
Wires, Measuring, 395
Wrenches, 225, 296, 362, 368, 386
Wrenches, Portable Electric, 65
Wrenches, Portable Pneumatic, 237

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Over The Editor's Desk

Bulwark of Defense

NO one could have attended the technical sessions of the American Society of Tool Engineers which were held in New York last month and not come away with the feeling that at least one important phase of our defense effort rests in perfectly capable hands. From the opening defense mobilization conference on through to the delivery of the final paper, the important role that is being played by the tool engineer in our present mobilization setup was repeatedly emphasized.

Tool engineers realize that upon their shoulders rests the responsibility for finding the ways and means of increasing the output of war materiel and they are determined to accept that responsibility with all the know-how at their command.

The job of preparing a great nation like ours to successfully wage war involves many groups of people with each group working toward the end that we might preserve the way of life to which we have become accustomed. The diplomats and the politicians find their job as being one of resolving political differences. When this fails or unprovoked aggression begins, the military must be prepared and ready to step in.

Important as the work of each of these and other groups is, none could ever hope to effectively resist an aggressor today without vast quantities of war materiel. And this is where the tool engineer has come to the rescue each time during recent national emergencies.

As a group, American Tool engineers during World War II turned in almost unbelievable records of achievement because they knew what was expected of them and they did not hesitate to go ahead and do it. They shared ideas with fellow engineers then even as they are now doing today. They saw the need for better methods and new machines and so they went about adapting better methods and developing new machines.

In the course of preparing for a war, neither stockpiles of raw materials nor vast mineral resources are of much value until they have been converted into ships, guns, and tanks. Manpower alone is not effective until it has been properly trained and adequately equipped. We are dependent upon our tool engineers to provide the know-how that will enable us to solve our complex production problems.

We in America may rest secure in the knowledge that our tool engineers are ready and able to meet any and all demands that may be made of them. In New York last month they proved this beyond doubt.

Fred W Vogel

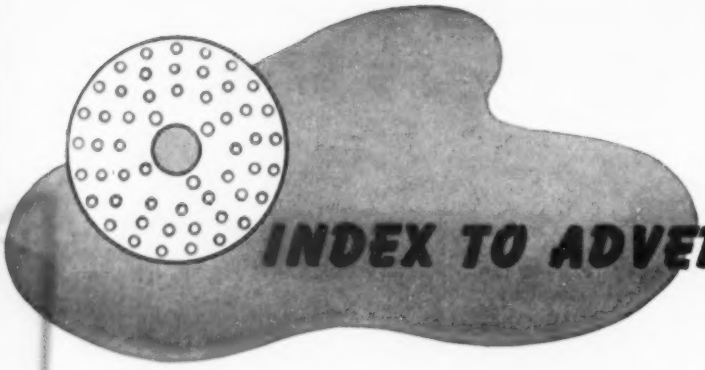
A.S.T.E. Elects New Officers



(Front row, left to right)—L. B. Bellamy, Detroit Branch, Sterling Grinding Wheel Co., First Vice President; J. J. Demuth, Sligo, Inc., St. Louis, Mo., President. (Rear row, left to right)—W. A. Thomas, Ford Motor Co. of Canada, Windsor, Canada, Secretary; H. C. McMillen, Seeger Refrigerator Co., Evansville, Ind., Treasurer; T. J. Donovan, Jr., Donovan Co., Philadelphia, Pa., Third Vice President; and Dr. H. B. Osborn, Jr., TOCCO Division, Ohio Crankshaft Co., Cleveland, Ohio, Assistant Secretary-Treasurer.

J. J. DEMUTH, general superintendent and member of the executive committee, Sligo, Inc., St. Louis, was elected president of the American Society of Tool Engineers at the Nineteenth Annual Meeting of the technical society held at the New Yorker Hotel. L. B. Bellamy, manager, Detroit Branch, Sterling Grinding Wheel Company, Division of Cleveland Quarries Company, was named first vice president, and Roger F. Waindle, general manager, Industrial Products Division, Elgin National Watch Company, Elgin, Illinois, was elected second vice president of the society. T. J. Donovan, Jr., owner, Donovan Company, Philadelphia, was elected third vice president; W. A. Thomas, superintendent of tool engineering, Ford Motor Company of Canada, was elected secretary; H. C. McMillen, general superintendent, Seeger Refrigerator Company, Evansville, Indiana, was named treasurer; and Dr. H. B. Osborn, Jr., technical director, TOCCO Division, Ohio Crankshaft Company, Cleveland, was chosen assistant secretary-treasurer.

Elected to the board of directors of the society, in addition to Messrs. Demuth, Bellamy, and Donovan and retiring president, H. L. Tigges, were: H. E. Collins, chief tool engineer, Hughes Tool Company, Houston, Texas; Jos. P. Crosby, vice president, LaPointe Machine Tool Company, Hudson, Massachusetts; E. W. Ernst, superintendent, General Electric Company, Schenectady, New York; G. A. Goodwin, chief process engineer, Master Electric Company, Dayton, Ohio; Ben J. Hazewinkel, L. S. Starrett Company, Denver, Colorado; and W. B. McClellan, engineer, Gairing Tool Company, Detroit.



INDEX TO ADVERTISEMENTS

— A —

A.H.C. Die Casting Machine Co. 367
Aber Engr. Works, Inc. 139
Accurate Bushing Co. 147
Ace Abrasive Laboratories 387
Ace Drill Bushing Co. 398
Acme Industrial Co. 264
Acme Tool Co. 378
Acme Wire & Iron Works 274
Acorn Bearing Co. 283
Acromark Co. 258
Adams Co. 239
Aget-Detroit Co. 323
Allegheny Ludlum Steel Corp. 62
Allen Co., A. K. 357
Allied Products Corp. 81
American Chain & Cable Co., Inc. 302
American Drill Bushing Co., Inc. 297
American Gas Furnace Co. 152
American Non-Gran Bronze Co. 398
American Pipe Bending Machine Co., Inc. 216
American Swiss File & Tool Co. 403
American Tool Works Co. 41
Ames Co., B. C. 275
Amco Precision Machine Works 405
Anderson Bros. Mfg. Co. 272
Apex Machine & Tool Co. 227
Armour & Co. 74
Armstrong-Blum Mfg. Co. 22
Armstrong Bros. Tool Co. 92
Atlantic Gear Works 292
Atlantic Saw Mfg. Co. 229
Auto Engraver Co., Inc. 376
Auto Moulding & Mfg. Co. 329
Automatic Steel Products, Inc. 190
Automatic Valve, Inc. 316
Avey Drilling Machine Co. 80, 250, 251

— B —

Baker Bros., Inc. ..... Third Cover
Baldor Electric Co. 309
Barber-Colman Co. 198, 197, 374
Barnes Drill Co. 177
Bartell Engr. Co. 301
Baumbach Mfg. Co., E. A. 287
Bay State Abrasive Products Co. 49
Bay State Tap & Die Co. 259
Behr-Manning, Div. of Norton Co. 173
Behr Products Co. 366
Benchmaster Mfg. Co. 388
Besly & Co., Chas. H. 89
Beverly Shear Mfg. Co. 384
Billings & Spencer Co. 386
Blair Tool & Machine Corp. 374
Blanchard Machine Co. 68
Bliss Co., E. W. 51
Bloomfield Tool Corp. 382
Boston Gear Works 46
Boyar-Schultz Corp. 381
Boye & Emmes Machine Tool Co. 389
Bradford Machine Tool Co. 361
Brewster-Squires Co. 291
Bridgeport Machines, Inc. 393
Brighton Screw & Mfg. Co. 228
Brown Engr. Co. 363
Brown & Sharpe Mfg. Co. 54
Buck Tool Co. 401
Buckeye Products Co. 375
Buckeye Tools Corp. 18
Buffalo Dental Mfg. Co. 304
Buffalo Forge Co. 27
Bullard Co. 175
Burke Machine Tool Co. 282
Busch Co., J. C. 158

— C —

Campbell Div., Andrew C. 302
Carboloy Co., Inc. 70, 71
Carborundum Co. 219
Carroll & Jamieson Machine Tool Co. 100
Carter Products Co. 295
Center Tool Co. 394
Chandler Tool Co. 360
Chicago Mfg. & Distributing Co. 154
Chicago Pneumatic Tool Co. 237
Chicago Screw Co. 324
Chicago Tool & Engr. Co. 288
Chicago Wheel & Mfg. Co. 303
Cincinnati Bickford Tool Co. 102
Cincinnati Electrical Tool Co. 420
Cincinnati Gilbert Machine Tool Co. 117
Cincinnati Milling Machine Co. 8, 9

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Index to Advertisements

Cincinnati Milling Products Div.,
Cincinnati Milling Machine Co. 171
Cincinnati Shaper Co. 99
Circular Tool Co. 145
Clark Co., Robert H. 157
Clark Instrument, Inc. 285
Clemson Bros., Inc. 226
Cleveland Tapping Machine Co. 190
Comet Tool Co. 307
Commander Mfg. Co. 319
Commercial Centerless Grinding Co. 296
Comtor Co. 302
Consolidated Machine Tool Corp. 271
Continental Machine Co. 285
Cook, Inc., L. H. 352
Cooley Electric Mfg. Corp. 306
Criterion Machine Works 286
Crosman & Son, Inc., J. B. 316
Cross Co. 272
Crucible Steel Co. of America 415
Cuno Engr. Corp. 325

— D —

D & M Guard Co. 386
Danly Machine Specialties, Inc. 237
Dayton Rogers Mfg. Co. 291, 345, 399
Dearborn, J. W. 345
Delaware Tool Steel Corp. 234
Delco Products Div., General Motors Corp. 297
Delta-Rockwell Power Tool Div. 52, 53
Detroit Broach Co. 86, 87
Detroit Die Set Corp. 267
Detroit Power Screwdriver Co. 221
Detroit Reamer & Tool Co. 90
Detroit Stamping Co. 311
DeVlieg Machine Co. 61
Diversified Metal Products Co. 16
DoAll Co. 32, 39, 43
Doyle Vacuum Cleaner Co. 276
Dreis & Krump Mfg. Co. 269
Dremel Mfg. Co. 77
Dumore Co. 111
Durant Tool Supply Co. 232
Dykem Co. 144

— E —

Eastern Centerless Grinding Co. 298
Eclipse Counterbore Co. 291
Economy Machine Products Co. 372
Economy Tool & Machine Co. 148
Edney Products Co. 222
Engis Equipment Co. 182
Erickson Tools Div. 379
Errington Mechanical Laboratories, Inc. 114
Ex-Cell-O Corp. 179
Elsler Engr. Co., Inc. 396
Exco Mfg. Co. 389

— F —

Farrel-Birmingham Co., Inc. 5
Federal Press Co. 317
Federal Products Corp. 78
Felters Co., Inc. 223
Fischer Machine Co. 315
Flynn Mfg. Co. 349
Foote-Burt Co. 31
Fosdick Machine Tool Co. 14
Fostoria Pressed Steel Corp. 298
Fulflo Specialties Co., Inc. 343
Fulmer Co., C. Allen 84

— G —

Galland-Henning Mfg. Co. 265
Gallmeyer & Livingston Co. 55
Gammons-Hoaglund Co. 295
Gardner Machine Co. 17
General Die & Stamping Co. 295
General Engr. & Mfg. Co. 241
General Pattern Works 398
Geneva Machine & Tool Co. 394
Gillen Co., John 289
Gisholt Machine Co. ..... 168A, B, C, D
Globe Products—Heat Seal Corp. 355
Gorton Machine Co., George 19
Grant Mfg. & Machine Co. 376
Gray Machine Co. 354
Greenfield Tap & Die Corp. 269
Greenlee Tool Co. 230
Grinders & Fixtures, Inc. 307
Grob Bros. 292
Grobet File Co. of America 312

— H —

Hall Mfg. Co. 342
Hamilton Tool Co. 121
Hammond Mchry. Builders, Inc. 287, 293, 315
Hanchett Magna-Lock Corp. 233
Hanchett Mfg. Co. 390
Hanson-Whitney Machine Div.,
Whitney Chain Co. 6
Hardinge Brothers, Inc. 69
Hart Machine Co. 301
Hartford Special Mchry. Co. 155
Hartmann Mfg. Co. 122
Haskins Co., R. G. 40
Hauser Machine Tool Corp. 48
Heald Machine Co. ..... Second Cover
Hetmann Mfg. Co. 256
Hendey Machine Co. 16
High Speed Hammer Co., Inc. 340
Hirschmann Co., Carl 48
Hisey-Wolf Machine Co. 58
Hjorth Lathe & Tool Co. 354
Hoggson & Pettis Mfg. Co. 289
Holo-Krome Screw Corp. ..... Fourth Cover
Houghton & Co., E. F. 151
Howald Machine Works, W. T. 311
Howe & Fant, Inc. 185
Hutchinson Co., Wm. T. 349

— I —

Ideal Industries, Inc. 377
Independent Pneumatic Tool Co. 65



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Index to Advertisements

Index Machine Co. 130
Industrial Equipment Co. 174
Industrial Products Suppliers 366

— J —

J & S Tool Co., Inc. 277
Jarn Devices, Inc. 280
Jacobs Mfg. Co. 59, 299
Jarvis Co., Chas. L. 15
Jefferson Machine Tool Co. 124
Johnson Gas Appliance Co. 281

— K —

Kalamazoo Tank & Silo Co. 249
Kearney & Trecker Corp. 187
Kennametal, Inc. 101
Kent Machine Co. 352
Kester Solder Co. 272
Kling Bros. Engr. Works 113
Klingelhofer Machine Tool Co. 383
Knight Mchry. Co., W. H. 11

— L —

L & J Press Corp. 172
L-W Chuck Co. 263
Landis Machine Co. 2
Landis Tool Co. 12, 13
Lapeer Mfg. Co. 368
LeBlond Machine Tool Co., R. K. 24, 25
Lee Co., K. O. 284
Lees-Bradner Co. 417
Leiman Bros., Inc. 217
Lewthwaite Machine Co., T. H. 352
Lima Electric Motor Co. 247
Lindberg Engr. Co. 243
Linley Bros. Co. 301
Lipe-Rollway Corp. 47
Littell Machine Co., F. J. 178
Littleford Bros., Inc. 346
Ledge & Shipley Co. 32
Logan Engr. Co. 4
Lovejoy Flexible Coupling Co. 356
Lovejoy Tool Co., Inc. 78
Luers, J. Milton 294
Lynn Mfg. Co. 345
Lyon Metal Products, Inc. 361

— M —

M-H Products 168
Machine Products Corp. 166
Madison-Kipp Corp. 305
Manhattan Rubber Div. 297
Martin Machine Works, J. E. 278
Master Mfg. Co. 61
Master-Tapet Co. 362
Maurey Mfg. Corp. 186, 280
Melvonough Mfg. Co. 299
Mead Specialties Co. 327
Metal Carbides Corp. 184
Metallizing Co. of America 188
Metallizing Engr. Co., Inc. 245
Metzgar Co. 258
Meyers Co., Inc., W. F. 308
Michigan Chrome & Chemical Co. 306
Michigan Drill Head Co. 116
Miller-Knuth Mfg. Co. 313
Miller Motor Co. 194, 195
Millers Falls Co. 409
Minnesota Mining & Mfg. Co. 91
Mitchell Co., E. C. 305
Modern Machine Tool Co. 169
Moline Tool Co. 311
Monarch Machine Tool Co. 66, 67
Montgomery & Co., Inc. 289, 297
Moore Special Tool Co., Inc. 56
Morris Machine Tool Co. 26
Morse Twist Drill & Machine Co. 20, 21
Motch & Merryweather Mchry. Co. 72
Motor Tool Mfg. Co. 224
Mummert-Dixon Co. 278

— N —

National Automatic Tool Co., Inc. 83
National Machine Tool Co. 120
National Tool Co. 57
National Twist Drill & Tool Co. 106
Nebel Machine Tool Co. 396
Neise, Karl A. 344
Nelco Tool Co., Inc. 150
New Hermes, Inc. 174
New Method Steel Stamps, Inc. 291
Nichols Engr. Co. 370
Nichols-Morris Corp. 265
Nicholson & Co., W. H. 329
Nicholson File Co. 129
Nielsen, Inc. 397
Nielsen Tool & Die Co. 348
Nobur Mfg. Co. 262
Northwestern Tool & Engr. Co. 249
Norton Co. 42, 210, 211
Nu-Matic Grinders, Inc. 142
Numberall Stamp & Tool Co. 282

— O —

OK Tool Co. ..... First Cover
Oliver Instrument Co. 165
Oliver Machinery Co. 242
O'Neil-Irwin Mfg. Co. 119
Ottemiller Co., Wm. H. 347

— P —

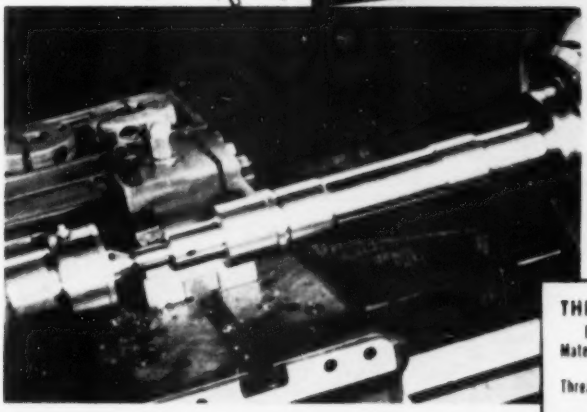
Palmer-Shile Co. 73
Parker Stamp Works, Inc. 321
Pedrick Tool & Machine Co. 261
Pines Engr. Co., Inc. 131
Pittsburgh Stamp Co., Inc. 372
Pope Mchry. Corp. 143
Porter Machine Co. 398
Pratt & Whitney, Div. of Niles-Bement-Pond Co. 60
Preis Engraving Machine Co., H. P. 288
Precunier Safety Chuck Co. 341
Production Devices, Inc. 366
Products Machine Co. 125

— Q —

Queen City Machine Tool Co. 279



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Index to Advertisements

— R —

R. H. Tool Co., Inc. 347
Racine Tool & Machine Co. 293
Raybestos-Manhattan, Inc. 297
Reading Machine Co. 382
Ready Tool Co. 349
Reid Bros. Co., Inc. 313
Reid Tool Supply Co. 346
Reltool Corp. 336
Rice Pump & Machine Co., Inc. 354
Richards Co., J. A. 373
Rivett Lathe & Grinder, Inc. 297
Roberts Rubber Co., Weldon 82
Rockford Machine Tool Co. 36
Rodgers Hydraulic, Inc. 153
Ross Operating Valve Co. 140
Rotor Tool Co. 191
Rouse & Co., H. B. 251
Royal Oak Tool & Machine Co. 238
Ruleta Co., Inc. 351
Ruthman Mchry. Co. 413
Rutland Tool Service 320

— S —

S & S Hinge & Metal Products Co. 270
Sales Service Machine Tool Co. 380
Sanford Mfg. Co. 231
Savage Co., W. J. 298
Scherr Co., Inc., George 347, 374
Schlecht & Son, L. G. 304
Schmidt, Inc., Geo. T. 213
Seibert & Sons, Inc. 344
Seneca Falls Machine Co. 23
Service Machine Co. 164
Services Directory 398, 399
Severance Tool Industries, Inc. 180
Sheffer Collet Co. 199
Sheldon Machine Co., Inc. 339
Sidney Machine Tool Co. 167
Simonds Abrasive Co. 88
Simonds Saw & Steel Co. 85
Skilsaw, Inc. 44, 45
Smith & Sons, Geo. W. 331
Smith Tool & Engr. Co. 304
South Bend Lathe Works 159
Speedgrip Chuck, Inc. 314
Sperman Metal Specialties 348
Stackhin Corp. 220
Standard Electrical Tool Co. 30
Standard Gage Co., Inc. 111
Standard Pressed Steel Co. 29, 359
Standard Steel Specialty Co. 285
Standard Tool Co. 231
Starrett Co., The L. S. 123, 127
Sterling Factory Equipment Co. 279
Stone Mchry. Co. 413
Strong, Carlisle & Hammond Co. 75
Stuart Oil Co., D. A. 326
Sturdimatic Tool Co. 369
Sturdy Broaching Service 260
Sturtevant Co., P. A. 362
Sundstrand Machine Tool Co. 208
Sundstrand Magnetic Products Co. 163
Super Tool Co. 255
Superior Hone Corp. 328
Superior Indicator Co. 394
Syntron Co. 322

— T —

Taft-Peirce Mfg. Co. 28
Tamms Industries, Inc. 256, 292
Tester, C. E. 254, 370
Thermo Electric Mfg. Co. 335
Thomas Hoist Co. 309
Thriftmaster Products Corp. 315
Tietzmann Tool Corp. 215
Torit Mfg. Co. 273
Troyke Mfg. Co. 340
Tubing Appliance Co. 296
Twentieth Century Mfg. Co. 260, 266

— U —

Union Twist Drill Co. 183
Union Wire Die Corp. 218
U. S. Diamond Wheel Co. 360
U. S. Electrical Tool Co. 246
U. S. Products Co. 293
U. S. Steel Supply Co. 407
Universal Engr. Co. 232

— V —

V & O Press Co. 370
Van Keuren Co. 395
Van Norman Co. 34, 35
Van Products Co. 288
Vascoloy-Ramet Corp. 137
Verson Allsteel Press Co., Inc. 265
Victor Mchry. Exchange, Inc. 391
Vimco Mfg. Co. 392
Vulcan Tool Co. 79

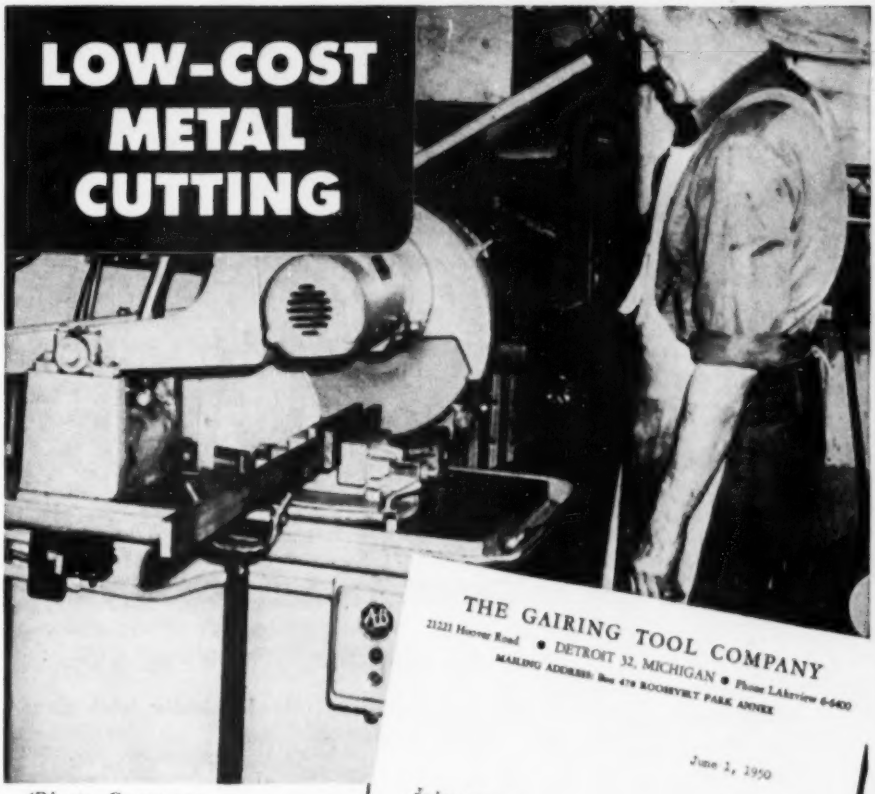
— W —

Wales-Strippit Corp. 192, 193
Walker Co., Inc., O. S. 253
Walker-Turner Div., Kearney & Trecker Corp. 7
Walls Sales Corp. 350
Waltham Machine Works 112
Walton Co. 126
Wardwell Mfg. Co. 226
Warner & Swasey Co. 27
Watts Bros. Tool Works 362
Weldon Tool Co. 318
Wells & Sons, W. F. 382
Whistler & Sons, Inc., S. R. 3
White Dental Mfg. Co., S. S. 38
Whitman & Barnes 149
Whitney Mfg. Co., W. A. 283
Whitney Metal Tool Co. 371
Wicaco Machine Corp. 287
Wiedemann Machine Co. 227
Wilson Mechanical Instrument Co. 189
Wilton Tool Mfg. Co. 294
Winter Bros. Co. 104
Wittek Mfg. Co. 181
Wood & Spencer Co. 353
Woodworth Co., N. A. 257

— Z —

Zagar Tool, Inc. 50
Zeh & Hahnemann Co. 278
Zirgler Tool Co., W. M. 238

LOW-COST METAL CUTTING



(Photo Courtesy Gairing Tool Corp.)



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June 2, 1950

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John Miller

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